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SURVEY
OF
ALBERTA

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1983

ARCHAEOLOGY IN ALBERTA 1982

David Burley

Alberta
CULTURE
Historical Resources

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Compiled by

David Burley

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FOREWORD

ARCHAEOLOGY IN ALBERTA: 1982

Paul F. Donahue

In keeping with the format introduced last year, this Annual Review consists primarily of abstracts of field projects and brief reports of special interest.

As of this writing, 53 abstracts for projects undertaken in 1981 that were not included in last year's report and 93 of the 155 permitted 1982 projects are presented in this volume. Permits for 1982 totalled 50 less than in 1981; a 24.5% decrease. Projects undertaken this past year can generally be grouped into subdivisions (12%), linear developments (61%), area developments (10%), government developments (7%), and research (10%). The ratio of development oriented to research oriented projects is 9:1.

The papers presented in this Annual Review are quite varied. Ives and Fenton discuss their ongoing research to determine locations of natural occurrences of Beaver River Sandstone which can then be compared with archaeological occurrences in order to ascertain cultural aspects relative to dispersal. The Beaver River Quarry site is a designated Provincial Historic Resource located near Fort McMurray.

Dr. James Helmer, University of Calgary, provides an interim report on archaeological field school activities at the Strathcona Site on the east edge of Edmonton. The Strathcona Site was opened to the public in 1980. Facilities include an interpretive centre, laboratory and site area which the public has access to via a boardwalk system. The University of Calgary has conducted a field school at this site since 1981 under contract to the Archaeological Survey. Volunteers were invited to work at the site under controlled conditions during the 1982 field season. Cultural components at the site date to the Middle and Late

Prehistoric Periods and indicate both workshop and habitation functions.

Rod Heitzmann's "A Comment on Bone Pegs and Stone Circles" records the recovery of a bone peg in situ associated with a possible ceremonial tipi near Big Stone, Alberta.

Brian Ronaghan's report on an archaeological impact assessment at the Genesee Power Project site west of Edmonton provides a brief summary of accomplishments up to the end of the 1982 field season. The development--a major coal mining and electricity generating project--will cover some 28 square miles. Thus far, 533 sites have been recorded over a four square mile area and, in 1982, between 60,000 and 70,000 lithic artifacts were collected. Tentative identification of diagnostics indicate occupation from the Early Prehistoric to the Late Prehistoric Period or a potential 12,000 year period. Two research goals of this project were (1) the establishment of a culture history for the study area, and (2) the determination of why sites are located where they are. Subsequent efforts focused on bringing some resolution to these questions.

The Black Fox Island Project, under the direction of Kathleen Connor Learn, was a research rather than a mitigation project. This study took place on a small island in Lac La Biche and focused on determining the physical parameters of a pottery yielding site located there as well as comparisons with other known sites in the area and the discovery of other sites on the island.

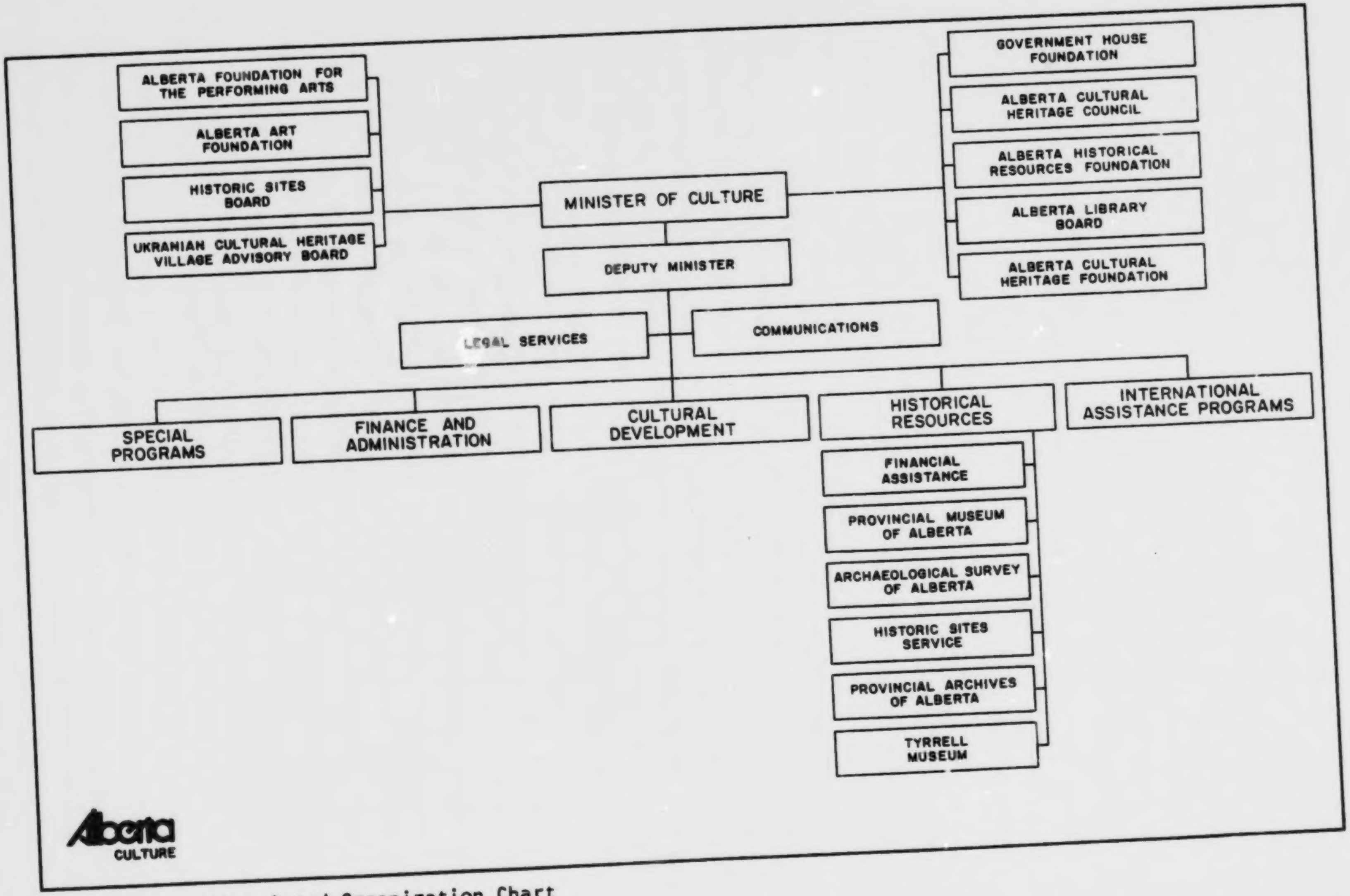
Brumley and Rushworth's report on Alberta radiocarbon dates and the introduction by Vickers are very useful contributions in that they bring together most of the C-14 dates presently available on archaeological sites in Alberta. The authors all make it abundantly clear that pitfalls await the unsophisticated user; however, one cannot dispute the utility of this compilation as a reference tool.

Research at Dry Island Buffalo Jump Provincial Park by Wright and Ball had three objectives: to determine the nature and extent of the deposits; to test the effectiveness of test pit sampling; and to gather botanical specimens using a flotation device. Tentative results of their study were that the site was periodically used over the last 2000 years and that campsites existed above and below the killsite.

Ives and Hardie's paper on Tertiary Hills welded tuff in Northern Alberta focuses on a raw material that was first identified by Jacques Cinq-Mars in 1973 and which came from the Keele River area of N.W.T. No other source areas for welded tuff are known to occur. The presence of this material in the Birch mountains and Lesser Slave Lake areas should necessarily indicate movement by trade over a 1000-1200 kilometre straight line. The paper essentially puts other archaeologists on notice about this material.

Trends on Historic Surfaces. . . .by Heinz Pyszczyk stems from a study undertaken under contract to Alberta Culture and directed at ascertaining the extent of historic resources remaining at the North West Company and Hudson's Bay Company Forts at Dunvegan along the Peace River. Pyszczyk attempted to conclude the frequency and distribution of archaeological surficial remains with subsurface features and activity areas. Based on statistically valid surface sampling procedures and through the use of SYMAP, a computer mapping programme, and trend surface analysis Pyszczyk tentatively concludes there is good possiblility that dwellings and tuffs (refuse areas) may be more readily recognized in future with larger portions of the site excavated.

Figures 1 and 2 are included for information purposes. Figure 1 depicts the position of the Archaeological Survey within Alberta Culture. Figure 2 illustrates the three main components--Administration, Resource Management, and Research--of the Archaeological Survey and identifies the staff member responsible for each position. Since 1974, the Archaeological Survey of Alberta has established formal referral systems with a number of provincial government agencies including Transportation, Environment, Energy and Natural Resources, Energy Resources Conservation Board, Recreation and Parks, and Municipal Affairs, as well as nine regional planning commissions. As a result of these contacts, over 10,000 development projects were reviewed and approximately 1500 development projects involving either historical resources impact assessments or mitigation were coordinated through the archaeological Survey in 1982/83. As an outgrowth of this activity, 1111 new sites were added to the site inventory, bringing the total number of recorded sites in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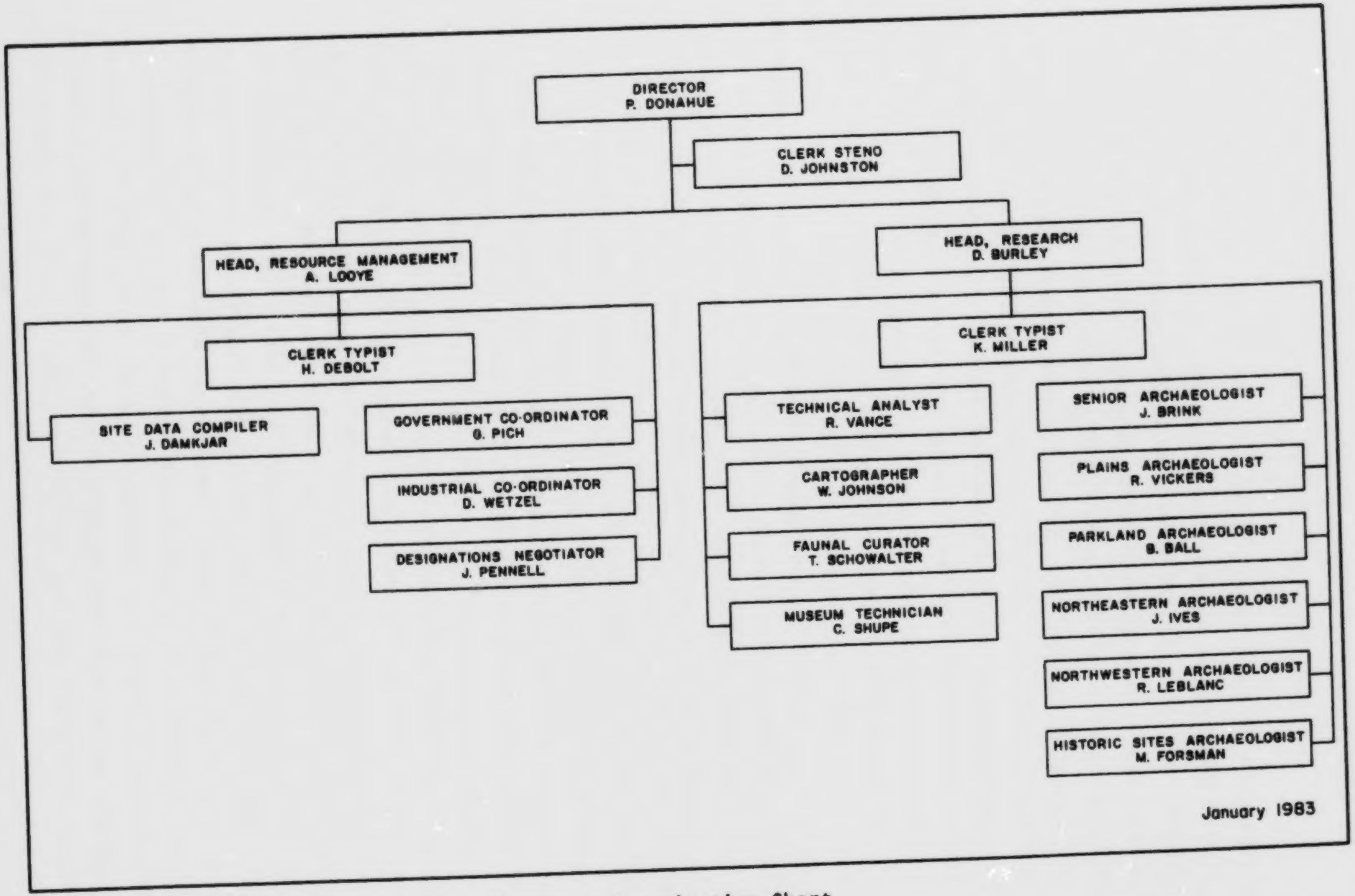
ALBERTA ART FOUNDATION
HISTORIC SITES BOARD
UKRANIAN CULTURAL HERITAGE VILLAGE ADVISORY BOARD
MINISTER OF CULTURE
GOVERNMENT HOUSE FOUNDATION
ALBERTA CULTURAL HERITAGE COUNCIL
ALBERTA HISTORICAL RESOURCES FOUNDATION
ALBERTA LIBRARY BOARD
ALBERTA CULTURAL HERITAGE FOUNDATION
DEPUTY MINISTER
LEGAL SERVICES
COMMUNICATIONS
SPECIAL PROGRAMS
FINANCE AND ADMINISTRATION
CULTURAL DEVELOPMENT
HISTORICAL RESOURCES
INTERNATIONAL ASSISTANCE PROGRAMS
FINANCIAL ASSISTANCE
PROVINCIAL MUSEUM OF ALBERTA
ARCHAEOLOGICAL SURVEY OF ALBERTA
HISTORIC SITES SERVICE
PROVINCIAL ARCHIVES OF ALBERTA
TYRRELL MUSEUM
Alberta CULTURE

Figure 1: Abbreviated Organization Chart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HEAD, RESOURCE MANAGEMENT
A. LOOYE
HEAD, RESEARCH
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CLERK TYPIST
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J. IVES
NORTHWESTERN ARCHAEOLOGIST
R. LEBLANC
HISTORIC SITES ARCHAEOLOGIST
M. FORSMAN

January 1983

Figure 2: Archaeological Survey of Alberta - Organization Chart

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Alberta to 14,500.

A number of in-house projects designed to improve upon our management of the resources and to provide public education have been undertaken along with some new responsibilities. Staff archaeologists instituted an eight part lecture series on Alberta archaeology that is oriented to lay people. Thus far it has been presented in Edmonton, Calgary and Red Deer and it will be given in other communities such as Peace River, Fort McMurray, Lethbridge and Medicine Hat over the next few years. Staff have also initiated teaching a credited introductory course in Alberta archaeology at the University of Alberta one semester each year. Approximately 40 students were enrolled in the first class. Staff continue to provide talks or lectures whenever they are invited to and this past year spoke to the Alberta Treasure Hunters Association, Peace River Historical Society, Archaeological Society of Alberta chapters in Medicine Hat, Lethbridge, Calgary and Edmonton, the Petroleum Institute Training School, and classes at the Universities of Lethbridge and Calgary, as well as to other provincial government agencies. Archaeological Survey staff published a total of twelve papers and presented eight conference papers in 1982/83. Tim Schowalter, Osteologist at the Archaeological Survey, co-founded "Zooarchaeological Research News" with Jean Williams of the University of Alberta, Department of Anthropology.

A new brochure outlining what the Archaeological Survey is and does was also published and three other thematic pamphlets are currently in the process of being produced. Development and excavation plans for the public interpretation of Head-Smashed-In, a UNESCO World Heritage Site, are ongoing and are expected to result in major fieldwork in 1983. Other excavations oriented toward development and public interpretation also took place at Leitch Colleries, Dunvegan, Lille, and Strathcona Science Park. The latter site is a fully interpreted archaeological excavation open to the public. Research excavations are undertaken by the University of Calgary, Department of Archaeology as their summer field school in archaeology. Public participation is invited under controlled conditions.

Other new undertakings include increasing our holdings in cultural resource management literature. One person has been assigned this responsibility over a short term. The Survey is also in the process of formulating a collections policy and procedures. To this end, the individuals involved have studied a broad range of policies and precedures in place elsewhere and are initiating draft policies for the Archaeological Survey. These policies and procedures will cover a broad spectrum from field recording to curatorial procedures.

The Archaeological Survey was also assigned administrative responsibility for the Designation Programme this past fiscal year and was requested to develop a procedure that would increase the effectiveness of the programme. Under the Historical Resources Act in Alberta, the Minister of Culture may protect historic resources (buildings, archaeological or paleontological sites, natural features, movable artifacts) and qualify the owners for receiving grant monies. The Designations Programme is very popular and results in some 400 requests for designations being received each year. Approximately 25 sites have been designated on average each year since 1975.

Archaeological Survey Research staff undertook a number of projects over this past year. Jack Ives, Northeastern Archaeologist, and Dr. Raymond LeBlanc, Northwestern Archaeologist, combined efforts on a limited excavation of a microblade site on the Alsands lease situated downstream from Fort Mackay on the right bank of the Athabasca River. Five microblade cores, similar to American PaleoArctic Cores (Campus & Denali) and 88 microblades, as well as a notched transverse burin have been recovered from this site (HhOv-73). Ives also continued his research on clearing activity by winter stripping as it effects archaeological survey assessments. Initial results are that winter clearing provides improved exposure with minimal impact and provides the opportunity to collect virtually complete site assemblages.

Ives and Dr. Mark Fenton of the Alberta Research Council continued a joint research project into the source origins of Beaver River Sandstone in the Athabasca River Valley north of Fort McMurray. Beaver River Sandstone is a very distinctive material that was widely used by prehistoric inhabitants of the oil sands area.

The Birch Mountain archaeological study, also directed by Ives, is investigating the relationship of subsistence settlement systems of the oil sands area with those of the Birch Mountain, parkland-like highland to the northwest. This study is being done in conjunction with Robert Vance, Archaeological Survey of Alberta paleo-environmentalist. Vance's research presently centres on a palynological analysis of cores from these lakes.

Ray LeBlanc undertook further test excavations at the late prehistoric Hidden Creek site (FjPx-6) on the northwest shore of Lesser Slave Lake. This work was a continuation of his 1981 research programme.

Bruce Ball, Parkland Archaeologist, was involved in a number of field projects. One, an inventory of privately held archaeological collections in the parkland region, was carried out by two STEP employees under his direction. They contacted several dozen local collectors and museums and arranged to record and photograph artifact collections. In addition to the documentation of the artifacts themselves, several new site locations were recorded and locational data regarding generalized temporal and technological trends were identified. A second project involved the salvage of a human burial intrusive to a paleontological shell deposit near Cardston, Alberta. The skeleton is that of a middle aged female who appears devoid of any degenerative and infectious diseases. Associated with the burial were several artifacts which included a possible bone ornament, an obsidian perforator and a side-notched projectile point. The third project focused on the Dry Island Provincial Park Buffalo Jump (this volume).

J. Roderick Vickers, Plains Archaeologist, undertook limited test excavations at Head-Smashed-In Buffalo Jump, a UNESCO World Heritage site located west of Fort Macleod in southwestern Alberta. This site is slated for major interpretive development by Alberta Culture.

Michael Forsman, Historic Archaeologist, directed excavations at the early 20th century coal mining sites of Lille, Leitch Colleries and outlying residential areas of Blairmore and Frank. Excavations at Lille focused on attempting to identify and characterize the nature of material culture differences between distinct residential areas and economic levels. Excavations at Leitch Collieries, a site soon to be interpreted to the public, were mitigation oriented. Several subsurface depressions were partially excavated and determined to be of little significance to further understanding the industrial activities carried out at the site.

To my mind the Archaeological Survey is making excellent progress in its efforts to conserve, record and interpret the past. Should you have any questions or comments I would be most pleased to receive them.

TABLE 1: 1982 PROJECT PERMITS ISSUED BY THE ARCHAEOLOGICAL SURVEY OF ALBERTA

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-1	Stan Saylor	City of Medicine Hat, Subdivision (Industrial): Brier Park, Medicine Hat
82-2	Stan Saylor	City of Medicine Hat, Subdivision (Residential): Crescent Hts., Medicine Hat
82-3	Gloria Fedirchuk	Transalta Utilities, Transmission line/ tower pads: Devon
82-4	Rebecca Balcom	Gulf Canada Resources, Pipeline (gas), trench/railspur: Mitigation FgQg-2, Robb
82-5	John Pollock	Alberta Power Ltd., Transmission line: Parsons Creek to Hangingline, Robb
82-6	Jennifer Hunt	Nova, Pipeline (gas): Mitigation EeOo-16, AGTL "Eastern Leg", Jenner
82-7	Bruce Wright	Wimpey Western Ltd., Subdivision (Residential): Mitigation EgPn-146, Calgary
82-8	Stan Saylor	CFB Suffield Defense Construct, Impoundments: reservoir, Medicine Hat
82-9	Don Steer	Esso Resources Canada Ltd., Pipeline (gas): Cheddarville to Crimson Lake, Strachan
82-10	Brian Ronaghan	Edmonton Power/City of Edmonton, Borrow source: Mitigation FiPn-17, and FhPh-13, Genesee
82-11	Rod Heitzmann	City of Medicine Hat, Park: Med. Hat Regional Valley
82-12	John Pollock	Nova, Pipeline: Edson Mainline Loop, Rocky Mountain House

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-13	Laurie Brumley	Research, Test excavation: Irvine Kill, DlOn-3, Irvine
82-14	James Helmer	Research, Test excavation: Strathcona Site, FjPi-29, Edmonton
82-15	Stan Saylor	Howard Jones/Realty World, Subdivision (residential): Medicine Hat
82-16	John Pollock	Nova, Pipeline (gas): Barich Lateral, Smoky Lake
82-17	John Pollock	Suvan, Fettig & Assoc./Hilltop, Subdivision (residential): Hinton
82-18	Barry Newton	Bruyer Consulting/Local Dev. Group Subdivision (residential) and test FiQj-11: Hinton
82-19	John Pollock	Alberta Power Ltd., Transmission line: Spirit River to Fairview
82-20	Mike Forsman	Alberta Govt., Historic sites testing: Frank Leitch Collieries (DjPn-112), Stephansson House, Bellevue, Markerville
82-21	J. Rod Vickers	Alberta Culture/Housing & Public Works, Road, parking, walkway--DjPk-2, Test excavation, Head-Smashed-In Ft. McLeod
82-22	Brian Ronaghan	Edmonton Power/Fording Coal, Borrow source testing, grading: Genesee
82-23	Jennifer Hunt	Shell Canada, Pipeline (gas): Scotford
82-24	PROJECT CANCELLED	
82-25	Don Steer	Pan Canadian Petroleum Ltd., Coal lease: Vulcan and Champion
82-26	John Pollock	Nova, Pipeline (gas): Heart River to McLennan
82-27	Maurice Doll	Research, Excavation FdPe-1 Buffalo Lake Metis Cabin site

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-28	Alan Bryan	Hamilton Lake Developers, Subdivision (resort): Vilan
82-29	Jennifer Hunt	Alberta Power, Railspur right-of-way realignment, Sheerness
82-30	Bea Loveseth	Dekalb Petroleum Corp/Duckworth Pipeline (gas): Nevis gathering system & plantsite, Bashaw
82-31	Rebecca Balcom	Alberta Power Ltd., Railline: borrow sources for Sheerness Project
82-32	Jennifer Hunt	Alberta Power Ltd., Water line/Mitigation EhPa-2, Finnegan/Sheerness Project
82-33	Bruce Ball	Research/Rescue Archaeology, Burial - excavation DiPj-12, Cardston
82-34	Margaret Kennedy	Cohas, Evamy & Partners, Subdivision: Shopping mall, Calgary
82-35	Barry Newton	County of St. Paul, Subdivision/refuse dump/road, St. Paul
82-36	Russell Brulotte	Research, Study area: Racehorse Creek, Test excavation DkPp-11, DlPo-1, 4, 9, 28, 29
82-37	Rebecca Balcom	Canadian Western Natural Gas, Pipeline (gas): realignment, Okotoks
82-38	Barry Newton	Merland Explorations/Western Oil Field Environmental Services, Pipeline (gas): Nova, St. Paul
82-39	Ed McCullough	CEP Consultants Ltd./Jager Holdings, Subdivision: Calgary
82-40	Jack Ives	Research, Lithological study, test HgOv-29, HhOv-16 and survey, Fort MacKay
82-41	Jack Ives	Research, Alsands lease and test HhOv-73, (visit HhOu-20, 21, 24) Fort MacKay

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-42	Ed McCullough	Esso Resources Canada Ltd., Drill sites/ reclamation, post-clearance survey, Ft. MacMurray
82-43	Rod Heitzmann	Western Oil Field/Merland Exploration, Pipeline (gas): Gorden area, Hanna
82-44	Rod Heitzmann	Pancanadian Petroleum Ltd., Pipeline (gas): Entice gathering system, Rockyford
82-45	Rod Heitzmann	Mutrie Wishart Env. Consult. Ltd., Pipeline (gas): Countess-Leckies, Bow City
82-46	Rebecca Balcom	Union Carbide/Flour Canada, Pipeline (ethylene glycol): Blackfalds
82-47	Rebecca Balcom	B.C. Forest Products, Industrial site: mill & railspur, Whitecourt
82-48	Rebecca Balcom	B.P. Canada Ltd., Pipeline, Bonnyville
82-49	J. Michael Quigg	Transalta Utilities Ltd., Transmission line, Jenner to Empress
82-50	J. Rod Vickers	Research/P. Watson, landowner, Surface collection: DjPk-1, Kenney site, Brocket
82-51	James Calder	Patrician Land Corp. Ltd., Coal/strip mine/Subdivision, Canmore
82-52	J. Michael Quigg	AESL/St. Mary's River Irrigation District, Irrigation system and test exc. DhOx-5, 6, 7: Warner
82-53	Stan Van Dyke	Canadian Hunter Expl., Pipelines (gas): South Wapiti, Grande Prairie
82-54	Bea Loveseth	Dekalb, Pipeline (gas), Mitigation FdPh-4; FdPg-13, 18; FcPg-16: Buffalo Lake
82-55	John W. Ives	Alberta Forest Service, Campground: GeOv-4 impact, Barnegat

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-56	Rod Heitzmann	Pancanadian Petroleum Ltd., Pipeline (gas): Atlee-Buffalo
82-57	Stan Van Dyke	Gulf Canada Resources Ltd., Pipeline (gas): Gilby to Rimbey
82-58	Stan Van Dyke	Manalta Coal Ltd., Coal mine: Sheerness/Roselyn
82-59	J. Michael Quigg	Alta. Environment/AESL, Pipeline (water): Deadfish Creed Diversion/Brooks
82-60	Stan Saylor	New Lake Resources, Pipeline, Jenner
82-61	John Brumley	Alberta Environment, Impoundment: Forty Mile Coulee, Bow Island
82-62	Brian Ronaghan	Fording Coal/Edmonton Power, Coal lease: Genessee
82-63	Ed McCullough	Esso Minerals Canada Ltd., Coal lease: Hinton East Coal Project, Hinton
82-64	Rebecca Balcom	Shell Canada/Assoc, Kellogg Ltd., Pipelines, Mitigation FkPg-61 & 62, Fort Saskatchewan
82-65	Jennifer Hunt	Westmin Resources, Pipeline/Compressor station: St. Paul
82-66	Kathleen Connor Learn	Research, Survey & test: Black Fox Island, Lac La Biche
82-67	Rod Heitzmann	Transalta Utilities Corp., Transmission line: Jenner/County of Newell
82-68	Timothy Losey	Ron Willow Development/Alsask, Subdivision (cottage/resort), Winfield
82-69	Raymond LeBlanc	Research, Excavation GjPx-6; GiQa-3 and survey, Lesser Slave Lake & N.W. Alberta
82-70	Bruce Ball	Research, Excavation ElPf-1, Dry Island Buffalo Jump Prov. Park

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-71	Sheila Minni	Alberta Housing Corporation, Subdivision: Lac La Biche
82-72-c	Eugene Gryba	Alberta Transportation/A.F.S., Highways: survey 1982 and camp Province of Alberta
82-73	Margaret Kennedy	Canadian Superior Oil Ltd., Pipelines (gas): Wardlow/ M.D. Berry Creek
82-74	Barry Newton	Interprovincial Pipeline Ltd., Pipelines: I.P.L. Borrow Source, Bistcho Lake
82-75	Ed McCullough	Canstar, Oil Sands: Leases 38 & 39, Ft. McMurray
82-76	John W. Ives	Research, Oil sands: North Clear Narrows site HkPa-6 & Clear Lake, Birch Mountains/Ft. MacKay
82-77	J. Michael Quigg	Murphy Oil Company Ltd., Oil well and access road: Grassy Lake
82-78	Gloria Fedirchuk	Canadian Pacific, Railspur: Ft. Saskatchewan
82-79	Bea Loveseth	Pembina Pipelines Ltd., Pipeline: Drayton Valley
82-80	John Pollock	Transalta Utilities Corp., Transmission line: St. Albert
82-81	Shawn Haley	Nova, Pipeline: Bear River, Grande Prairie
82-82	Shawn Haley	Alberta Utilities & Tel. Pipeline: Slave Lake
82-83	Maragaret Kennedy	City of Calgary, Light rail transit system, Mitigation EfPm-50, Fish Creek Prov. Park
82-84	PROJECT CANCELLED	
82-85	Shawn Haley	Nova, Pipeline: County of Newell, Bassano

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-86	Rebecca Balcom	Foothills Pipelines Ltd., Pipeline: B.C. to Fox Creek, N. Alberta
82-87-c	Barry Newton	Alberta Transportation, Roads: Mitigation of GaOp-1 & , Muriel Lake
82-88-c	Margaret Kennedy	Alberta Transportation, Roads: Hwy. 3 mitigation of DjPo-4, 6, 30 & 63 and Greenhill
82-89	Bruce Wright	Transalta Utilities on C.F.B., Transmission line: Suffield
82-90	Mike Forsman	Research, Historic mine town: Lille Excavations DjPo-112
82-91	Bruce Wright	Alberta Transportation, Test excav. EaOr-3, Medicine Hat
82-92	Stan Saylor	City of Lethbridge, River Parks System, Lethbridge
82-93	Becky Balcom	Gulf Canada Resources, Pipeline (gas): FgQg-5, Robb
82-94	Bea Loveseth	Sundance Oil, Pipeline (gas): Mitigation of EhPc-88, EhPh-55 & 60, Drumheller
82-95	Barry Newton	Lexaco Testing Ltd., Survey of Cutlines, I.D. 14 near Coal Valley
82-96	Heinz Pyszczyk	Research, Dunvegan, Fairview
82-97	Shawn Haley	Nova, Pipeline: trenching, Lacombe
82-98	Barry Newton	Shell Canada Resources Ltd., Gas gathering system, I.D. 20, Gordondale
82-99	Bruce Wright	City of Red Deer, Park Development, Waskasoo
82-100	Brian Ronaghan	Alberta Power, Transmission line, Bonnyville/Cold Lake
82-101	Shawn Haley	Amoco Canada Petroleum Ltd., Natural gas pipeline, Rocky Mountain House

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-102	John Pollock	Greg Myer, Subdivision, Athabasca
82-103	John Pollock	Transalta Utilities, Transmission line, Entwistle
82-104	Sheila Minni	Norcen Energy Resources, Pipeline, County of Lac La Biche
82-105	Jim Calder	Jager Holding Ltd., Industrial Development, Calgary
82-106	Shawn Haley	Nova, Pipeline & Meter Station, Wainwright
82-107	Jim Calder	Dekald Petroleum Ltd., Gas gathering system, Buffalo Lake, Lacombe County
82-108	Rod Heitzmann	PanCanadian Petroleum, Gas Gathering System, Hussar
82-109	Shawn Haley	Northwestern Utilities, Gas Pipeline, Genessee/Keephills
82-110	Jennifer Hunt	D & S Petroleum Consultants, Wellsite, Taber
82-111	Bruce Wright	Canadian Superior Oil Ltd., Pipeline, Majorville
82-112	J. Michael Quigg	Mark Felesky, Subdivision, Medicine Hat
82-113	Bea Loveseth	Home Oil, Pipeline (oil): Excavation EhPm-34, Balzac
82-114	John Pollock	Nova, Kehiwin pipeline, Muriel Lake/ Bonnyville
82-115	Ian Wilson	Alberta Environment, Reservoir, County 4, Bassano
82-116	Barry Newton	Nova, Pipelines - surveys - Wabasca
82-117	John Pollock	Nova, Pipeline, south of Slave Lake

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-118	Jack Brink	P.P. Development, Alberta Prov. Park, Buck Lake
82-119	Rebecca Balcom	Canadian Western Natural Gas, Pipeline: Mitigation EcPk-7, Claresholm
82-120	Don Steer	Nova, Pipeline, Lac La Biche
82-121	Don Steer	Nova, Pipeline (gas), Lac La Biche
82-122	Bea Loveseth	Alberta Transportation, Highway Project: Mitigation EiPo-3, County of Wheatland
82-123	Rebecca Balcom	Luscar Ltd., Surface mine, Tofield
82-124	John Brumley	Newlake Resources, Pipeline R-O-W, Wardlow
82-125	Rod Heitzmann	Alberta Transportation, Mitigation EgOt-4, Youngstown
82-126	Ed McCullough	Esso Minerals Canada Ltd., Coal mine, Hinton
82-127	Shawn Haley	Nova, Pipeline (Nat. gas), Vermillion
82-128-c	Ed McCullough	Alberta Transportation, Highway Construction, Excavation EdPp-21 & 22, EfPq-5 & 6, Bragg Creek & Black Diamond
82-129	Stan Van Dyke	CEP Consultants, City of Calgary research, Calgary
82-130	Shawn Haley	I.D. Engineering, Proposed Park, Lloydminster
82-131	John Pollock	K.B. Drake & Assoc., Subdivision Cold Lake
82-132	Stan Van Dyke	City of Calgary, Reservoir, Calgary
82-133	Shawn Haley	Nova, Gas pipeline, Camrose
82-134	Ed McCullough	Alberta Transportation, Highway, Calbine Lake/Sandy Lake

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-135	Margaret Kennedy	Mitigation DjPo-40 & 155, Crowsnest Pass
82-136	Barry Newton	Fort Industry Management, Industrial Subdivision, Fort Saskatchewan
82-137	Michael Quigg	Dome Petroleum, Gas pipeline R-O-W, Herron
82-138	Stan Saylor	Rand Development, Wellsite, Medicine Hat
82-139	Stan Van Dyke	City of Calgary, Park Development, Calgary
82-140	Rod Heitzmann	Bruyer Consulting Group, Subdivision, Edmonton
82-141	Shawn Haley	Nova, Pipeline/transmission line, Near Big Valley, County of Stettler #6
82-142	Stan Van Dyke	Scion Petroleum, Pipeline lateral, County 17 near Sundre
82-143	John Pollock	Nova, Pipeline, Fawcett
82-144	John Pollock	Transalta Utilities, Transmission line, Fort Saskatchewan
82-145	Rod Heitzmann	Biewag Energy Resources, Industrial Subdivision, Waskatenau
82-146	Rebecca Balcom	Canadian Western Natural Gas, Pipeline (gas), near Taber
82-147	Barry Newton	Transportation, Highway upgrading, Dewberry
82-148	Don Steer	Nova, Pipeline (gas), Westlock
82-149	Michael Quigg	Nova, Pipeline (gas), Schuler
82-150	John Brumley	Ocelot, Wellsite, N. of Bow Island
82-151	Rod Heitzmann	Colt Engineering, Pipeline (gas), Vulcan

PERMIT NO.	ARCHAEOLOGIST	PROJECT
82-152	John Pollock	Nova, Pipeline, Rich Lake
82-153	John Pollock	Nova, Pipeline, Rich Lake
82-154	Michael Quigg	Rony Petroleum Limited, Rueben Jacover, Canadian Land Masters, Gas Wellsite, Bindloss
82-155	PROJECT CANCELLED	
82-156	PROJECT CANCELLED	
82-157	Norman Catto	Geological Contract, Head-Smashed-In, Buffalo Jump
82-158	Tom Head	Research, Excavation EhPm-34, Rockyview
82-159	B.O.K. Reeves	Novalta Resources Ltd., Pipeline construction, Iddesleigh

ABSTRACTS

For 1981 and 1982 Permits Obtained From The Archaeological Survey of Alberta

The following abstracts represent those unpublished in the 1981 annual review and those available for 1982 permit reports at the time of publication.

D.B.

PERMIT NO.	PERMIT HOLDER	PROJECT
81-1	B.M. Newton Settlement Surveys Ltd.	Grief, Manzie, Subdiv., Edmonton

An archaeological survey was conducted on a proposed rural subdivision located approximately 5.0 km west of the Edmonton municipal limits and 0.8 km north of Highway No. 16X, to the south of Big Lake.

A total of 20, .50 m^2 test pits were judgmentaly located within the confines of the proposed development, with particular emphasis being placed on areas of high archaeological potential. This program of intensive subsurface testing did not reveal the presence of any historic, prehistoric or palaeontological sites on the property.

As no sites were located during the course of the survey, it is recommended that the devlopment be allowed to proceed without further concern for historical resources.

81-12	B.W. Wright ARESCO Ltd.	NOVA, Pipeline (EeOv-22) Patricia

As requested by Nova, ARESCO Ltd. conducted an Historical Resource Impact Assessment of several spoil disposal sites, and a rerouted segment of the Alaska Highway Gas Pipeline (Zone 6). Three historical resource sites were found at the spoil sites and two along the pipeline right-of-way.

In addition, a previously recorded site EeOv-22 containing a small rock feature and minor lithic scatter was mapped and test excavated.

The results of the mitigation and field surveys are described in this report. No further work is recommended except at EeOm-20 on the South Saskatchewan River.

81-34	B.M. Ronaghan Lifeways of Canada Ltd.	Canuck Engineering, Bitumen Pipeline, Cold Lake to Edmonton

Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of the proposed Alberta Energy Company bitumen pipeline from the Esso Resources Lemming Pilot Project to the Strathcona refinery in Edmonton.

Field reconnaissance involved a foot traverse of the entire pipeline route. Site identification procedures utilized opportunistic examination of exposures, shovel testing in areas of potential in which suitable exposures were not present, and power auger testing of sensitive creek and river crossings. Site assessment techniques involved visual examination, excavation of 1x1 m tests, and additional placement of shovel tests.

Eleven historic sites and 26 prehistoric sites were identified in field studies. The historic sites primarily relate to early agricultural expansion into central Alberta by Euro-Canadians and Metis. All of these sites are sufficiently off the proposed alignment that avoidance of indirect impact is the only recommended mitigative procedure for these sites.

The 26 prehistoric sites range from isolated finds of single artifacts to disturbed campsites and lithic workshops. Only six of these were considered to be of sufficient value to warrant further work. Because of the generally small size of these sites, conservation procedures are recommended over the more cost intensive option of pipeline movement. Two sites are recommended for compensatory surface collection (FlPf-14, FjPh-10) and four sites are recommended for conservation excavations (GaPb-11, 12, 14, and 15).

81-38	B.M. Ronaghan Lifeways of Canada Ltd.	Douglasdale Estates, Subdiv., Calgary

During the fall and winter of 1981, the southern portion of the Bow Bottom Site, EfPm - 104, was excavated as part of conservation studies in support of the construction of a residential development. Excavations carried out on the Douglasdale Estates complement those carried out along the Deerfoot Extension during the fall and winter of 1980. The Douglasdale excavations involved four complete tipi rings and 12 inter-ring features. All of the tipi rings excavated contained a central, stone lined, hearth. Also similar to previous excavations, the Douglasdale tipi rings all contained high numbers of artifacts. Of particular note was the finding of additional examples of the diagnostic Kootenay project point type. In other respects, both the classes of artifacts represented, their density and distribution are similar to those encountered in the central portion of the Bow Bottom Site. These data should contribute greatly to the interpretations of the site as a whole.

The Douglasdale excavations, in contrast to the Deerfoot excavations, resulted in the identification of a large number of inter-ring features. The data resulting from the excavation of the 12 features will add immeasurably to our understanding of the site function and perhaps the season of occupation.

81-44	S.J. Minni Historical Resources Consultant	Edmonton Power Monitor (FjPi-63), Edmonton

At the request of Edmonton Power and the Department of Engineering, City of Edmonton, archaeological monitoring was undertaken during underground ductline and cable installation and traffic realignment at the north end of the 105th Street Bridge, Edmonton. The developments were located within an area where historic burials and remains (FjPi-63) had been exposed during previous developments.

The monitoring occurred in areas pre-determined by Alberta Culture whenever work was in progress. During the monitoring the partial remains of one human skeleton were recovered from previously disturbed road fill and one in situ human skull was noted below the road fill in an undisturbed context. The disturbed remains were collected and the skull was left in situ.

The skeletal remains were the only historical resources noted during the monitoring. The area of the remains coincides with the location of previously exposed human burials. It is the consultant's opinion and recommendation that monitoring should occur whenever future developments will impact the area along Rossdale Road from the northern end of the 105th Street bridge to west of the Rossdale Substation.

81-49	D.N. Steer DS Consulting	Alberta Housing & Public Works, School, St. Albert

On May 16 and 17, 1981 DS Consulting carried out an historical resources inventory and impact assessment of approximately 17 hectares of property associated with the Poundmaker Lodge Alcohol and Drug Abuse Centre located northeast of the city of St. Albert. An additional 19 hectares of land peripheral to the principle study area was also included in the assessment. The study was conducted to provide an inventory of historical resource sites in the area and provide clearance for development of the proposed new Poundmaker/Nechi Centre scheduled for construction in 1982.

Foot traverses and extensive subsurface testing were conducted throughout the total area. Three historical resource sites were noted and recorded during the survey. These included, one prehistoric campsite, an historic cemetery and the historic Poundmaker Lodge and related ancillary structures. The campsite and cemetery will not be affected by construction. However, remains related to the Poundmaker Lodge ancillary structures may be affected by development dependent on final location of the centre. Recommendations and mitigative measures for the sites are suggested.

81-54	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Calgary Power, Transmission Line, Keephills - Ellerside

An Historical Resources Impact Assessment of selected portions of the proposed TransAlta Utilities Corporation Keephills to Ellerslie 500 kV Transmission Lines, resulted in the identification of twenty-seven prehistoric sites. Nineteen sites are isolated finds.

Of the identified sites twenty-two (N = 22) will not be impacted by the erection of towers. As specified in the work requirements outlined by the Archaeological Survey of Alberta, Alberta Culture these sites did not require assessment. Although they were recorded in the course of the field studies, they were not fully evaluated. No further studies relative to the proposed project have been recommended for these sites.

The remaining five sites will be subject to impact by the erection of a tower. These sites were assessed through the excavation of a 50 x 50 centimeter unit at each of the proposed cement footing locations. The shovel testing program indicates that tower placement will not cause any damage to the identified sites. No further studies relative to the proposed project have been recommended.

81-56 J.M. Hunt
ARESCO Ltd.
Calgary Power, Subdiv., Duffield

In May and June, 1981 an Historical Resource Impact Assessment of the proposed Keephills townsite and access roads was undertaken by ARESCO Ltd..

The study area was visited on three occasions at various stages of preliminary road clearing and construction. The disturbance was valuable in that exposures were created and a large number of prehistoric sites were found.

Of the seventeen prehistoric sites recorded 15 were not recommended for further investigation based on their small size or the severity of the disturbance.

It is further recommended that road construction be allowed to proceed around sites recommended for further work.

81-62 E.J. McCullough
Fedirchuk, McCullough & Assoc. Ltd.
Calgary Power, Transmission Line, Brooks - Taber

Seven prehistoric sites were identified during the Historical Resources Impact Assessment of the proposed Transalta Utilities Corporation Brooks-Vauxhall-Taber 138 kV Transmission Line. Two (DkPa-5, DkPa-6) are stone feature sites and five (DkPa-2, DkPa-3, DlPa-7, DkPa-8, DlPa-8) are artifact scatters. The stone feature sites, DlPa-5 and DlPa-6, are considered significant. The features lie outside the pole placement zone. Potential impacts may result from compaction and displacement of features by vehicular activity. Avoidance of the stone features and restriction of the construction zone is recommended.

Sites DkPa-2, DkPa-3, DlPa-7, DkPa-8, and DkPa-9 artifact scatters, are judged to be of limited value. No further studies have been recommended. Photographic documentation, recording, and collection of the artifacts have mitigated impact.

81-66 J.M. Hunt
ARESCO Ltd.
Nova, Mitigation of EeOm-20, McNeil

This report details the excavation of two rock features, a cairn and a partial tipi ring to be impacted at site EeOm - 20. This prehistoric campsite is located on the east terrace of the South Saskatchewan River.

The mitigation program consisted of total excavation of the ring feature plus four external 1 X 1 m units. The cairn was excavated by means of a single 2 X 2 m unit superimposed on the feature. Lithic debitage was limited in the cairn to five flakes, however 254 artifacts were recovered in the ring. This included eight tools or partial tools.

Two complete projectile points were found and have been identified as Late Prehistoric side-notched, dating from about 2,000 - 1,500 B.P.

Features to be impacted at the site have been sufficiently tested to mitigate their loss. The remaining features have been preserved by fencing.

Subject to written approval by the Archaeological Survey of Alberta, it is recommended that Nova, An Alberta Corporation, be allowed to proceed with the use of the site. Should other features at EeOm - 20 be endangered by future development, it is recommended that testing occur.

81-68c	R.J. Heitzmann Heitzmann Consulting Ltd.	Transportation, SR 627 and SR 779, Stony Plain

A Historical Resources Impact Assessment was carried out on proposed highway construction routes along 1.6 km of SR 779 and 4 km along SR 627. Two separate areas were examined, one adjacent to Longhurst Lake, the other in rolling uplands south of Jackfish Lake. Both of these areas are located south west of Stony Plain in the County of Parkland.

The field examination procedures consisted of foot traverses on both sides of the proposed road right of way. Shovel testing was carried out where surface exposures were felt to be inadequate.

When a site was located, the site boundary was determined by surface artifact distribution, if in a ploughed field; or by shovel testing, if covered in forest. At least one shovel test was dug in each site to determine depth and possible presence of buried materials.

Five historical resources sites were recorded. Four of these are prehistoric sites FiPn 19, 20, 21 and FiPl 7. One is a standing historic building the Brightbank School. All of the prehistoric sites have been evaluated as having low potential for yielding further archaeological data.

The Brightbank School is in use as a community hall and will not be affected by the proposed construction.

81-70	J.M. Quigg Ethos Consultants Ltd.	Environment, Assoc. Engineers, Pipeline, Deadfish Creek

A historical resource inventory of the planned Deadfish Water Diversion Project from the Red Deer River to Deadfish Creek was undertaken.

This was followed by site assessment at thirteen historical sites including cairns, stone circles, historic depressions and buried campsites. Although cultural material was encountered at all localities, they were not assessed as significant enough to stop planned development. In fact the site assessment program revealed no site worth further mitigation. Consequently, recommendations are for no further investigation at these localities, except for monitoring the development activities to insure no accidental destruction beyond the right-of-ways.

81-81	S.G. Van Dyke Lifeways of Canada Ltd.	Wimpey, Subdiv. EgPn-146, Calgary

Archaeological studies were carried out at EgPn-146, an archaeological site located on lands proposed for subdivision development by Wimpey Western Limited in the Nose Hill uplands, in northwest Calgary. The studies consisted of: (1) conservation excavations of eight stone tipi rings, part of a large tipi ring site, identified in earlier studies and (2) subsurface prospecting of underlying sediments to determine if earlier occupations lay below. Significant results were obtained from both programs.

Ring excavations, generally, were productive. Numerous artifacts, faunal remains and fire cracked rocks were recovered from most rings indicating relatively intensive occupation. Arrow points and potsherds were found indicating the site dates to ca. A.D. 1200-1700 and is associated with the Old Womans phase--the prehistoric Peigan peoples. These results were unanticipated. Most tipi ring sites of similar age and location have yielded very limited artifactual data.

Subsurface prospecting in small hollows indentified three buried occupations below the surface tipi rings. The upper occupation was associated with a buried tipi ring. It associates with the Late Mummy Cave cultural complex. Dated at 3000 B.C., it is representative of other sites of similar age and culture excavated elsewhere in the Nose Hill Uplands.

The two older occupations are campsites associated with the Early Mummy Cave complex dating ca. 5000-4800 B.C. They are of regional significance. Comparisons of the only other excavated site of this age and culture in the city--Hawkwood--indicates major differences between the sites.

The early occupations of EgPn-146 are of regional value for understanding past native land and resource use and cultural patterns of the Early Mummy Cave cultural complex. Their further study through block excavation of two areas (48 sq. m) each is recommended.

81-87 G.J. Fedirchik Esso, Petrochemical
Fedirchuk McCullough Facility, Redwater
& Assoc. Ltd.

An Historical Resources Impact Assessment was conducted on approximately three sections of land lying north of the existing Redwater fertilizer plant at the request of Lombard North Group Limited on behalf of Esso Chemical Canada. Fedirchuk McCullough & Associates Ltd. conducted the field work between June 15 and 21, 1981 involving systematic visual inspection of the area along essentially straight line traverses in areas of good visibility. In areas used as pasture or in forested regions, existing disturbances were inspected and subsurface tests were excavated at the discretion of the archaeologist. When sites were encountered an additional minimum of ten subsurface tests were excavated.

Forty-one prehistoric arhcaeological sites were located by the survey. All are surface sites with only one containing evidence for undisturbed buried cultural materials. Three have been recommended for further work. FlPh 24, a potentially old site, FlPg 24 which contains substantial surficial as well as undisturbed subsurface materials and FlPg 49 another large surficial site have all been recommended for surface collection and additional test excavation.

81-95 J.M. Quigg Hat Development, Ross
Ethos Consultants Ltd. Glen Site, Medicine Hat

Nearly 500m^2 were excavated in and adjacent to six stone circles and ancillary features at the Ross Glen Site (DlOp-2) as the mitigation of the significant site.

Extensive quantities of cultural debris were recovered supporting the earlier interpretation of a Besant occupation for the majority of the site with a few more points, endscrapers and pottery. The fragmentary ceramics were a significant find which were directly associated with a Besant point inside a stone circle.

A middle period occupation was also discovered at Ross Glen from Bitterroot, Hanna and Oxbow points including one stone circle (previously believed Besant) and at least one ancillary boiling pit feature.

81-99	J.W. Pollock Settlement Surveys Ltd.	Carma, Subdivision, Leduc

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on a proposed subdivision in the town of Leduc, Alberta.

In addition to a program of systematic subsurface testing of the property in general, particular emphasis was placed on surface and subsurface survey of the stream valley sides and terraces.

The survey resulted in the discovery of three historic resources sites consisting of two isolated prehistoric findspots (FhPj-7, 8) of limited scientific value. The third site (FhPj-9) consisted of a campsite in the form of a surface scatter of artifacts around a slough. Both the campsite and the two isolated findspots are considered to have limited archaeological significance and no further work is recommended on these sites beyond their initial documentation in this report.

81-103	B. Ebell ARESCO Ltd.	Calgary Power Ltd., Mitigation FiPo-60, 65, Duffield

In late June and early July 1981, ARESCO Ltd. conducted an historic resource impact mitigation program at two sites in the Keephills Subdivision for Saskmont Engineering Ltd. Edmonton.

Previous systematic surface and subsurface survey of the subdivision by ARESCO Ltd. had produced a number of heritage resource sites. In consultation with the Archaeological Survey of Alberta, two sites FiPo - 60 and

FiPo - 65 were recommended for test excavation.

FiPo- 60 was tested by means of 78 shovel tests and 10 - 1 X 1 m units. Seven lithic artifacts were recovered and the program was shortened due to the paucity of finds. FiPo - 65 was tested by means of 28 shovel tests and 30 - 1 X 1 m units. A total of 5,457 artifacts were recovered.

The work carried out to date at FiPo- 60 and FiPo - 65 have been successfull in assessing the potential scientific value of these sites. Subject to approval in writing by the Archaeological Survey of Alberta it is recommended that no further work be required at either site.

81-106	R.J. Heitzmann Heitzmann Consulting Ltd.	Environment, Slave River Hydro Feasibility Study

Archaeological Studies, Task Area 5, Slave River Hydro Feasibility Study, utilized archival and field data to prepare a preliminary statement of the effects of proposed hydro electric development on historical resources.

Field work considered four major aspects of the proposed project: damsites, impoundment area, downstream of the impoundment and transmission route alternatives. Throughout these field studies twenty-nine previously unrecorded historical resources sites were located.

A major historical resources, the Slave River Rapids, would be seriously affected by any damsite proposed. This is the site of major portage routes utilized throughout the historic period.

The impoundment area was examined in a random sampling programme. 1.12% of an area 976 km^2 was sampled and provides an estimate of 498±303 sites within the area of 213 m. The actual number of sites to be affected is assumed to be much less as current options favour impoundment levels of 204 or 206 m.

Six aternative transmission routes between the damsites and Fort McMurray were also preliminarily examined. Sixteen localities were selected to obtain data on areas where none had existed. Historical resources were found at four of these localities. Several known historical resources sites of major significance are located close to proposed transmission lines. These include Fort Chipewyan I, Fort Chipewyan III & IV and Peace Point Site (IgPc 1).

Recommendations are contained in the report on actions to be taken to mitigate the effects of the proposed development on historical resources.

81-109	R.J. Balcom ARESCO Ltd.	Calgary Power, Highvale Mine, Gainford

ARESCO Ltd. undertook a program of test excavation and surface collection of artifacts at prehistoric site FjPq-6, a campsite located on a small knoll immediately southwest of Wabamun Lake, Alberta. The site may be affected by TransAlta Utilities Highvale Mine Expansion Program.

The site was gridded into square collection units 10 m on a side. Each unit was further subdivided into four quadrants and all units were collected by a pattern of overlapping transects.

In addition 40 - 1x1 m^2 units were excavated at various localities. Due to prior disturbance at the site no intact remains were located and in fact the excavated units yielded only a total of 172 artifacts, which is 6% of the total collected in 1981 and 5.2% of the total collected to date (1977 plus 1981).

Five types of Middle to Late period projectile points were retrieved suggesting occupation as early as 5550 years before present. While no absolute dates are possible, it would appear that several mixed occupations are present. Disturbance of the site makes stratigraphic separation of these impossible.

Numerous scrapers and bifaces were recovered further suggesting a hunting/gathering subsistence pattern. Of particular importance was the recovery of a small number of possible microblade cores. These are somewhat rare and may suggest a mixture of Plains and Boreal Forest lithic assemblages.

No further work is recommended for FjPq-6 due to the success of the program just completed.

81-112	J.M. Hunt ARESCO Ltd.	NOVA, Spoil sites, Carstairs/Rosebud

An Historical Resources Impact Assessment was conducted on the stockpile site located about two kilometers south of Carstairs, Alberta.

Four transects were walked from north to south at 30 m. intervals. Six shovel tests were dug along each transect (30m apart) for a total of

24 tests. These averaged 30 cm on a side and 30 cm in depth. All shovel tests were negative.

No cultural materials were located. It is recommended that Nova be given clearance to utilize this site.

81-121	B.O.K. Reeves Lifeways of Canada Ltd.	S.L. Goodrich, Subdiv., Cochrane

In August 1981, Lifeways of Canada completed an Historical Resources Impact Assessment of the proposed Jumping Pound Creek development for a residential subdivision and golf course near Cochrane. Twelve prehistoric sites, seven of which had been previously recorded, were identified within the project area.

Eight of the prehistoric sites, situated on unbroken or partially disturbed lands consist of stone features. Most of these stone feature sites, of varying significance, will be lost in the proposed development. To mitigate this impact, a program of site and feature mapping and sample excavation is recommended.

Three buried sites were discovered through backhoe testing of the terraces at the confluence of the Bow and Jumping Pound. Two were stratified campsites containing 2-3 buried occupations, characterized by fire cracked rock, butchered bone, hearths, and in one instance possibly buried tipi rings. One site appears to be extremely rich and of major significance.

A buried bison processing campsite containing two buried occupations also of major significance was found on the low terrace along the east side of Jumping Pound Creek. Quantities of butchered bison bone were recovered from backhoe tests suggesting a kill probably was located along the nearby creek. A proposed golf course has been redesigned to incorporate the major portion of this site.

The major buried campsite will be lost in the proposed subdivision development, and a program of site excavations is recommended to mitigate development impacts. The appropriate level of effort should be determined through discussion with the Archaeological Survey of Alberta (ASA).

Analysis of the archaeological data in regional context indicates that the high density of sites located reflects, in all probability, focal prehistoric land use patterns associated with the Jumping Pound/Bow confluence; a known locale for prehistoric settlement on the Bow above the City of Calgary.

81-126c	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	Highway Mitigation Canyon Creek - Finnigan - Calling Lake

Evaluative investigations were undertaken at GhPh-11 by Fedirchuk McCullough & Associates Ltd., on behalf of Alberta Transportation. Potential sources of impact to GhPh-11 are the proposed upgrading and construction of Secondary Road 813 and the associated access facilities along Calling Lake, Alberta.

Preliminary investigations comprised of ten one-metre unit excavations and surficial reconnaissance were conducted in August, 1981. On the basis of recommendations for further work, an additional 80 square metres were excavated in October, 1981.

Information recovered indicates that this is a large base camp used for a variety of different activities for a period of at least 1,000 years. Identified activities in addition to subsistence procurement consist of tool manufacture, marrow extraction, hide processing and possibly bone and wood working.

On the basis of the size and information potential of the site, particularly in view of the exceptional preservation and presence of features, conservation measures are recommended for GhPh-11. The avoidance option in association with an information conservation and public awareness programme is strongly recommended. Should avoidance not be feasible, large scale excavations will be necessary. Additionally, in view of the developments at Calling Lake, further survey and assessment of related areas is recommended.

81-130	B.A. Loveseth Lifeways of Canada Ltd.	Alberta Energy, Mitigation, Cold Lake to Edmonton

In September 1981, Lifeways of Canada Limited carried out archaeological conservation studies for one of Alberta Energy Company's pipeline systems. The study was a follow-up to the May, 1981 Historical Resource

Impact Assessment of the proposed bitumen pipeline which is to be constructed from Esso Resources Lemming Pilot Project near Cold Lake to the Strathcona refinery in Edmonton.

Four sites (GaPb-11, GaPb-12, GaPb-13 and GaPb-14) east of Smoky Lake were to be studied by collection and/or salvage excavation. Near Bruderheim, one site (FlPf-14) was to be collected within the right-of-way, and a second (FlPf-8) to be relocated to determine if it would be affected by pipeline construction. The effects of the proposed system on sites (FjPh-7, FjPh-8) near Akenside were to be assessed and a third (FjPh-10) was to be systematically collected. FjPh-7, FjPh-8, and FlPf-8 were found to be off the pipeline right-of-way. The pipeline at FjPh-10 was rerouted and the site would not be affected. FlPh-14 did not yield any further cultural remains within the right-of-way. No further work is recommended for these sites.

The remaining sites were systematically collected and/or test excavated.

The archaeological conservation studies near Smoky Lake were most productive and added immeasurably to the archaeological record of the region. The occupations at three sites appear to be more related to those on the Plains than to the Boreal areas. Only further research will verify this. Conservation excavation and collection in our opinion have effectively mitigated construction impact and no further studies are recommended.

81-131	S.G. Saylor Ethos Consultants Ltd.	NOVA, Pipeline, Chard and Conklin

Ethos Consultants Ltd. conducted a Heritage Resource Impact Assessment of a proposed gas transmission line during September 28 - October 2, 1981, inclusive.

A total of approximately 79km of pipeline right-of-way was traversed. Of this total, 18.8km (23.8%) were intensively examined using a system of foot traverses and subsurface shovel test holes. Areas chosen for intensive examination included all major river and creek crossings, areas of mixed deciduous/coniferous vegetation and high, drier terrain adjacent to creek and river crossings, and inland areas of mixed vegetation and/or dry terrain thought to have potential for heritage resource sites. Excluded from intensive examination were areas of muskeg, spruce - tamarack dominated muskeg, and marsh.

No heritage resource sites were encountered during the survey. It is therefore recommended that development of the Graham Lateral be allowed to proceed.

Absence of heritage resource sites is postulated to be a result of large amounts of low potential areas examined within the development area, particularly muskeg, spruce-tamarack dominated muskeg and the absence of major creek and river crossings. Additional work in the region must be conducted in order to acquire an adequate understanding of the prehistoric settlement patterns.

81-132	S.G. Saylor Ethos Consultants Ltd.	NOVA, Pipeline: Leige Lateral, Pelican Portage-Chipewyn Lake

Ethos Consultants Ltd. conducted a Heritage Resource Impact Assessment of the proposed Leige Lateral gas transmission line during September 21-27, 1981 inclusive.

A total of approximately 173km of pipeline right-of-way was traversed. Of this total, 18.05km (10.4%) were intensively examined using a system of foot traverses and subsurface shovel test holes. Areas chosen for intensive examination included all major river and creek crossings, areas of mixed deciduous/conferous vegetation and high, drier terrain adjacent to creek or river crossings, and inland areas of mixed vegetation thought to have potential for heritage resource sites. Excluded from intensive examination were areas of muskeg, spruce-tamarack dominated muskeg, and marsh.

Heritage resource sites were not encountered during the survey. It is accordingly recommended that development of the Leigh Lateral be allowed to proceed.

Absence of heritage resource sites is postulated to be a consequence of extensive amounts of low potential areas within the development area, particularly muskeg and spruce-tamarack dominated muskeg. Additional work in the region is necessary in order to acquire an adequate understanding of the prehistoric settlement characteristics.

81-133	R.J. Balcom ARESCO Ltd.	Klippert Concrete, Bowmont Flats, Calgary

As requested by Corush, Larocque, Sunderland and Associates, ARESCO Ltd. conducted an historical resource overview of the proposed Bowmont Flats development area. This overview consisted of archival and field research.

The site area was inspected by means of foot traverses spaced irregularly throughout all areas not being quarried for gravel. Shovel tests were judgementally placed in areas where surface visibility was poor. Exposures such as rodent burrows, and the eroding banks of the Bow River were also inspected.

Although no historical resource sites were found during the study, an historical resource impact assessment is recommended in the event this area is fully developed.

81-144/ 81-160	B.O.K. Reeves Lifeways of Canada Ltd.	Rozsa Management, Wellsite program, Warner/Milk River

An Historical Resources Impact Assessment was carried out of two planned well sites in the near vicinity of the Milk River, east of Writing-on-Stone Provincial Park.

Visual examination was made of exposures within each lease--gopher mounds, cart tracks, cattle trails, and sheet erosion areas. Particular attention was paid to visible rocks, as they may be cultural (cairns or tipi rings) or natural. Inspection revealed the lease areas were essentially flat short grass covered ground moraine. Site visibility was excellent for stone features or surface sites in the moraine. Subsurface shallow testing was not deemed necessary. Field geoarchaeological assessment indicated no potential for thick silt deposits which might contain deeply buried animal kills or camps.

No historical resources, principally archaeological sites, were located. While results were negative, there are known sites in the near vicinity, along possible access roads, flow lines or in other potential well site locations. We recommend an HRIA should be carried out for these and any other development components.

81-145	M.A. Kennedy Lifeways of Canada Ltd.	C.E.P. Consultants, Golf Course mitigation, Calgary

Following recommendations based upon an Historical Resources Inventory conducted by Lifeways of Canada Limited in April 1981 for C.E.P. Consultants, a detailed historical resources impact assessment was carried out in the Valley Ridge golf course development area between September 14 and October 30, 1981. This assessment entailed several testing procedures designed for optimum exposure of archaeologcial sites; hand excavation of 2x2m (or equivalent 1x2m) test units, judgmental backhoe trenching and plowed transects across sites.

Of the nine sites at which test excavations occurred, five were related to campsite activities (EgPn-138, 227, 229 and 291) and four were bison kills/processing areas (EgPn-139, 285, 286 and 290).

Many of the sites offered a significant contribution to clearer understanding of prehistoric land use activities and bison procurement strategies in the Bow River area of the Foothills. Accordingly, conservation excavations were recommended at the conclusion of the testing program. However, an alternate form of conservation management was selected after consultation between the client, the Archaeological Survey of Alberta, and Lifeways of Canada Limited. Critical sites were buried, with the understanding that excavation could occur should future concerns warrant them. Bone samples from each component of the deeply buried kill sites and from all sites to be covered were retrieved, for both C-14 dating, and as curatorial samples. Limited excavations were conducted at a quartzite cobble reduction feature at EgPn-228, as this area was to be undercut as part of terraforming during golf course development.

81-153c	B.M. Ronaghan Lifeways of Canada Ltd.	Alberta Transportation Controlled surface collection, HhOv-16, Fort MacKay

The Cree Burn Lake site is a large, previously identified site complex above the east rim of the Lower Athabasca River valley north of Fort McMurra It is currently bisected by a wide, cleared right of way developed for highway construction. Controlled surface collection of artifact concentrations exposed along the alignment in various localities was undertaken using flexible rope grids aligned by existing survey markers, along the edges of the alignment. Data analysis has concentrated on a limited number of culturally relevant attributes and is presented in tabular form. The intent of the data analysis was to provide a data base for further analysis by the Archaeological Survey of Alberta.

81-159c	J.H. Brumley Ethos Consultants Ltd.	Environment, Dam/Reservoir, Forty Mile Coulee, Foremost

Ethos Consultants Ltd. was contracted by Alberta Environment to conduct an historical resource evaulation of certain areas of the Forty Mile Coulee Project and to prepare a long term planning document to evaluate historical resources vis-a-vis impacts.

This report presents a detailed discussion of field work conducted during the fall and winter of 1982 intended to inventory and evaluate historical resources present in the project area. Field information obtained is related to extant archaeological data for the region.

A settlement model for southeastern Alberta is developed and related to the Forty Mile Coulee Project area. A number of hypotheses are generated from this model to be tested in the course of historic resource work to be conducted. A detailed set of field and analysis procedures are developed intended to enable the achievement of these objectives.

Finally, work budgeting and scheduling requirements for the 1982 field season are developed.

81-161	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Alberta Utilities & Telephones Pipeline, Lesser Slave Lake

An Historical Resources Impact Assessment was conducted of the proposed Alberta Utilities and Telephones Swan River Natural Gas Pipeline scheduled for development in north-central Alberta.

The ground visibility along the proposed right-of-way was non-existent because of dense vegetation. As a method of discovering sites a subsurface testing program utilizing test units 50 centimeters in diameter was implemented. Twenty test units (ten on each side) were excavated at each drainage system intercept. Each test was excavated to a depth of 20-30 centimeters.

Because construction of the proposed natural gas pipeline was imminent, this development project, on the basis of the results of the present study, was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture. A post-construction audit of one section of the route which occurs in the hinterlands will be carried out in spring of 1982.

81-162 B.M. Ronaghan Canterra Energy Ltd.,
Lifeways of Canada Ltd. Pipeline, Hanlan-Brown
Creek

An Historical Resources Impact Assessment was carried out by Lifeways of Canada Limited on the proposed natural gas pipeline north of Nordegg, Alberta. The Hanlan-Brown Creek Pipeline lies in the forested outer foothills belt characterized by a low to medium relief landscape, bordered on the west by the outermost foothills ridge. Treed bogs and wet meadows are common.

The archaeological study involved aerial photograph interpretation, low level helicopter traverses, ground studies, utilizing foot traverses, shovel testing and visual examination of exposed areas. These field studies, the first systematic prehistoric reconnaissance in this area, were carried out during the month of October, 1981 by a two person crew.

Four prehistoric sites were identified, three small or isolated finds and a small workshop. These sites are assessed as having no further value for scientific research. No further preconstruction studies are recommended. A limited post construction monitoring program is however, recommended for a section of the alignment. These recommendations are those of the consultant, and not necessarily consistent with the requirements of the Alberta Historical Resources Act.

81-168 B.M. Ronaghan Gulf, Pipeline,
Lifeways of Canada Ltd. Beaverlodge

An Historical Resources Impact Assessment of the proposed wellsite development and the pipeline route in the Saddle Hills was undertaken for

Gulf Canada Resources Inc.

The foot traverses along the entire length of the proposed route as well as shovel testing failed to locate any historical resource sites. On the basis of the shovel testing and the lack of visible surface remains no further work is recommended.

81-171	S.G. Van Dyke Lifeways of Canada Ltd.	Melcor, Subdiv., Balzac

In conjunction with the proposed Melcor Subdivision development, Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of the properties involving the prairie level, the colluvial slope and the alluvial plain on both sides of Nose Creek immediately south of the Beddington/Delacor road.

Eleven prehistoric sites and two historic structures were identified. Of the eleven prehistoric sites, three had previously been designated under a single Borden Number--EgPm-28. The remaining sites were designated EgPm-219 to 228.

The two historic structures were identified as C.I.L. powder magazines reportedly dated to World War II.

The ring sites and buried find spots were assessed as having moderate values, the cairns and the stone feature were assessed as having low but recoverable values and the surficial small find was assessed as having no value.

It is recommended that two ring living floors, one from each side of Nose Creek, be test excavated. A sample of areas between rings should be de-sodded and plowed to determine if inter-ring activity areas are present. It is recommended that a similar stripping programme be carried out at EgPm-222 and EgPm-224 in order to determine tha nature of the stone features present. It is also recommended that the cairns be mapped and that one 1x1 m test be placed on EgPm-228 at the north end of the property. Finally, it is recommended that two, 1x2 m units be placed on each of the two buried finds noted by backhoe testing--EgPm-226 and EgPm-227.

81-174	B.A. Loveseth Lifeways of Canada Ltd.	Conlin Real Estate, Subdiv., Calgary

An Historical Resources Impact Assessment of the proposed development area in northeast Calgary was undertaken for Conlin Real Estate Limited. The ground reconnaissance was carried out on November 27th by a three-person crew.

The foot traverse of all sensitive areas as well as extensive shovel and backhoe testing resulted in the discovery of five prehistoric sites. These sites are of a low value and no further work is recommended.

81-176	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	PanCanadian, Gas Gathering System, Carseland Phase I

An Historical Resources Impact Assessment of the proposed PanCanadian Petroleum Limited Carseland Gas Gathering System Phase I, scheduled for development in southern Alberta, resulted in the identification of four historical resource sites.

One site, EfPi-4, is an isolated find; two sites, EfPi-1, EfPi-2, are artifact scatters; and one site, EfPi-3, is a campsite. Site EfPi-2, an artifact scatter, lies outside the proposed right-of-way and will not be subject to primary impact. No further study relative to the proposed project is recommended.

The remaining three sites lie within the proposed right-of-way and will be subject to primary impact. No further studies have been recommended. Photographic documentation, recording, and collection of the artifacts have mitigated impact.

81-178	J.H. Brumley Ethos Consultants Ltd.	Dome Petroleum, Wellsites, Jenner

On October 28, 1981 Ethos Consultants Ltd. conducted a Heritage Resource Impact Assessment of three proposed wellsites near Jenner, Alberta.

Examination of the access roads to the proposed wellsites involved slowly driving the right-of-way, stopping to examine localized disturbance areas for signs of heritage resource materials, and checking clusters of stones and any other items which might be indicative of heritage resources.

Wellsite examination involved a series of on foot traverses across the wellsite surface, each spaced at intervals of approximately eight to ten meters. Subsurface examination involved inspection of natural exposures consisting of deflated areas, rodent and badger burrows, for evidence of subsurface cultural materials.

No heritage resource material was observed at any of these locations and as a result, it is recommended that development be allowed to proceed.

81-180	M.A. Kennedy Lifeways of Canada Ltd.	Research, Sample excavation of DjPo-112, Lille Townsite

Research excavations were undertaken for Oxbow Historical Research Ltd. in the Crownest Pass at DjPo-112, the Lille Townsite, by a crew of six between November 3rd and 7th, 1981. The Terms of Reference as formulated by Oxbow Historical Research outlined the following research objectives to be investigated: (1) to determine if ethnic background (particularly Italian) of Lille miners could be identified in the material culture, (2) to identify, through comparative artifact analysis, status or rank differentiation between the mining segment of the town's population and those in positions of authority, such as the Mine Superintendant and First Mechanic, (3) to seek evidence of miner mobility/persistence between the Pass mines and towns.

Seven sites of assumed privy use, a town dump, and the former bakery site were selected for test excavations during an on-site examination of the townsite in October by the client, the Archaeological Survey of Alberta Historical archaeologist, and the writer.

The retrieved artifact sample was large (over 4500 fragments and whole examples of metal, glass and ceramic artifacts, over 7 kilograms of wire and scrap metal, almost 500 bone elements, most displaying butchering marks). Some tentative results and hypotheses were presented, although the nature and limitations of the research design and excavation sample fraction precluded full response to areas of concern as outlined in the Terms of Reference. A research design for early 20th century mining towns was suggested, to which further work at Lille and the other Pass towns could possibly be addressed.

81-183	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	Environment/AESL, Sewer Line, Stony Plain to Spruce Grove

An Historical Resources Impact Assessment of part of the proposed Parkland Sewage Transmission System route between Stony Plain and St. Albert was carried out by Fedirchuk McCullough & Associates Ltd.

Ground reconnaissance consisted of intensive examination of the proposed right-of-way. All parts of the right-of-way were visually examined during two parallel foot traverses. Almost all areas were ploughed and provided excellent surface visibility. To supplement the visual inspection, four shovel tests, each 30 centimetres square, were excavated beside Atim Creek. Despite excellent surface visibility, no historical resources were located.

It is recommended that this portion of the development proceed without further concerns for historical resources.

81-186	J. Damp Lifeways of Canada Ltd.	Paramount Resources, Gas gathering system, northeastern Alberta

Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of pipeline rights-of-way and related facilities sites of four gas gathering systems in northeastern Alberta. These were designated as Granor, Liege, Saleski and Chard. The total area proposed for development is 126 ha.

Archaeological studies focused on 22 "zones of interest". These consisted of major river crossings, tributary stream crossings, terrace features, river banks, lake shores and well drained areas exhibiting moderate differences in elevation from surrounding locations as determined by photographic signatures. Zones of interest were defined in consultation with the Archaeological Survey of Alberta. An overview flight of the study areas did not result in the identification of further zones of interest. Locations of field survey, numbers of shovel tests and photographic plates of characteristic terrain accompany this report.

No prehistoric, historic or paleontological sites were identified. In our opinion, no conflicts to the construction of the gas gathering systems exist. No further work is recommended.

81-188	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Transalta Utilities Transmission line, Jenner

An Historical Resources Impact Assessment of the proposed Transalta Utilities Corporation Ware Junction to Jenner Transmission Line, resulted in the identification of fourteen (N = 14) prehistoric sites and two (N = 2) palaeontological sites, near or within the proposed line of structure placement. Of the prehistoric sites, three (EeOu-15, EeOv-33, EeOv-35) are isolated finds; two (EeOu-14, EeOu-16) are artifact scatters; one (EeOv-34) is a surface campsite, and eight (EeOt-5, EeOt-6, EeOt-7, EeOt-8, EeOt-9, EeOt-10, EeOt-11, EeOt-13) are stone features.

Mitigative excavations or avoidance have been recommended for the stone feature site (EoOv-8) and the campsite (EeOv-34). The artifact scatters (EeOu-14, EeOu-16) and isolated finds (EeOu-15, EeOv-33, EeOv-35) warrant no further investigation. Photographic documentation, recording, and collection of the artifacts have mitigated impact.

The remaining prehistoric sites (EeOt-5, EeOt-6, EeOt-7, EeOt-9, EeOt-10, EeOt-11, EeOu-13) are situated outside the line of structure placement and will not be subject to primary impact. No further studies relative to the proposed project are recommended, however it is recommended that the sites be flagged to permit recognition and avoidance by equipment operators. The palaeontological sites include a small find of crocodilian bones/fragments (Site TA-1) and a bone bed/isolated limb bone (Site TA-2). Both sites lie within the line of structure placement and may be subject to primary impact. No further study of Site TA-1 is recommended. Photographic documentation, recording, and collection of the specimens have mitigated impact. Mitigative excavations or avoidance have been recommended for Site TA-2, the bone bed/isolated limb bone.

81-189	B.P. Kooyman Fedirchuk McCullough & Assoc. Ltd.	Passburg Petroleum/R.D. Niven, Pipeline, Camrose

An Historical Resources Impact Assessment of Passburg Petroleum Ltd.'s proposed Bruce Gas Gathering System was conducted for R.D. Niven Consulting Engineers Ltd.

An intensive pedestrian survey of the designated right of way was conducted by a two person field crew. The route had not been extensively surveyed and staked at the time of investigation, although occasional route indicators were present. A zig-zag traverse path was utilized along the right of way. In view of the minimal marking of the route, a 50 metre wide transect was examined to ensure that the correct route was covered by the survey.

The survey resulted in the identification of three historical resources sites. Site FfPb-1 is a surface scatter, site FfPb-2 is a prehistoric campsite and site FfPb-3 is an isolated find. All of these sites will be subject to primary impact.

No further study has been recommended. Photographic documentation, recording and artifact collection have mitigated impact.

81-190c	B.A. Loveseth Lifeways of Canada Ltd.	Environment, Impoundment: Buffalo Lake, Stabilization Alex

An Historical Resources Impact Assessment of the proposed Buffalo Lake Stabilization Project was undertaken for Alberta Environment. The project, located in central Alberta, included the following areas of possible impact: a pump plant site on the Red Deer River; a pipeline and canal from the Red Deer River to Alix Lake; outlet and channel drop control structures and canalization of Parlby Creek from Alix Lake to Buffalo Lake; and an outlet control structure at the Head of Tail Creek.

Visual examination of the route as well as extensive shovel testing resulted in the discovery of 16 prehistoric sites in the area, including a bison kill, eight campsites, one chipping station, one small find and five isolated finds. Two sites may be culturally affiliated with the Late Prehistoric (FcPg-12) or Protohistoric (FcPg-11)--the former on the basis of ceramics found which are associated with cultures that frequented the area in A.D. 1150 to 1800 and the latter by the recovery of a worked glass scraping implement in association with other lithic tools. All the other 14 sites did not contain culturally diagnostic materials.

Presently, limited excavation is recommended at one site--FcPg-15. Further work may be recommended pending possible alterations of the stabilization program or if sites located on the terrace above Parlby Creek will be affected either directly or indirectly by construction equipment. Backhoe and/or auger testing is recommended for the low flatlands in the Red Deer Valley at the location of the pump site as well as in depressions on the prairie level. Depressions south of Alix Lake and east of Parlby Creek near its entry into Buffalo Lake should also have deep subsurface testing to determine if buried soils and/or occupations are present.

81-194	B.A. Loveseth Lifeways of Canada Ltd.	Thornton Real Estate Ltd., Subdiv., Morningside

An Historical Resources Impact Assessment of a proposed residential development west of Morningside was undertaken for Thornton Real Estate of Lacombe, Alberta.

The field reconnaissance consisted of visual examination of the ground surface supplemented by shovel testing to determine if buried occupations were present. The latter was confined to the area east of the creek. This was partially determined by its high archaeological potential, and by the fact that the proposed acreage development will be concentrated in the portion of the parcel.

Two prehistoric sites were located during the field study, These, consisting of two isolated artifact finds, are of no further value. No further work is recommended.

81-197	J.M. Quigg Ethos Consultants Ltd.	Canadian Landmasters, Wellsites, Jenner

In late November 1981 Ethos Consultants Ltd. conducted a Heritage Resource Impact Assessment at two proposed wellsites for Canadian Landmasters in southeastern Alberta.

Field investigations consisted of foot traversing each wellsite, the access road and their immediate margins to locate any and all historical resources. In addition six shovel test holes were excavated on the inside margins of the wellsites adjacent to the observed surface features.

The field investigations yielded a stone circle site immediately outside each wellsite location, while no significant historical resources were discovered within the development area.

It is recommended that wellsite development be allowed to proceed with caution due to the surface features as shown on the maps.

81-202	J.M. Hunt ARESCO Ltd.	Nova, Pipeline, Mitigation, Jenner

At the request of Foothills Pipelines (Yukon) Ltd., ARESCO Ltd. undertook the mitigation of three sites located on the Eastern Leg of the proposed Alaska Highway Gas Pipeline.

Surface collection, mapping and test excavations of two of the sites, EeOr-64 and EeOr-65 could not be completed due to snow cover. The third site, EeOo-16, an extensive boulder scatter (possible cairn) was test excavated to determine whether the site is cultural. Two test units produced negative results.

81-203	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	Alberta Environment, Irrigation/Impoundment, Vauxhall (Badger Lake)

An historical resources overview of the proposed Badger Lake Reservoir, part of the Bow River Irrigation District, was undertaken November 25 and 26, 1981.

A sample of four quarter sections of an approximate total area of fifteen quarter sections was examined as part of this overview. Additional areas were also examined on a judgemental basis during the field reconnaissance. Two historical resources sites, EcPc 1 and 2 were located in the Badger Lake proposed reservoir area. EcPc 1 is a stone circle site, while EcPc 2 is an isolated find location.

Both sites lie within the proposed impoundment area and will be subject to primary impact. If the project proceeds additional studies are recommended at site EcPc 1. Archaeological excavation of 3 of the 9 stone circles at the site are recommended, with additional testing of other areas of the site. Backhoe testing is recommended in the seasonal lakebed adjacent to the site to determine if possible water-saturated areas contain preserved organic materials. No further research of site EcPc 2 si recommended. Photographic documentation and recording have mitigated impact. Based on the results of this overview study, additional inventory and assessment of a few specific areas not examined during this overview are recommended.

81-204	J. Damp Lifeways of Canada Ltd.	Nu-West, Subdiv., Scenic Acres Phase III, Calgary

An Historical Resources Impact Assessment was conducted of the proposed Scenic Acres Stage III development for Nu-West Development.

The onground examination consisted of foot traverses of the area on two separate occasions; backhoe testing in areas where no surface exposures existed and potential for buried soils and possibly subsurface cultural remains existed and finally, shovel testing of the various historical sites.

Field studies resulted in the identification of three prehistoric archaeological sites (EgPn-237, 238 and 240). EgPn-237 and 238 are characterized by scattered cultural material and a single tipi ring--EgPn-240 consist of a scatter of cultural material.

Based on material noted in the existing exposures, that were recovered during the subsurface testing program and the presence of stone features, additional work is recommended at each site. The nature of this work is outlined later in this report.

81-205	J. Damp Lifeways of Canada Ltd.	Nu-West, Subdiv., Calgary

An Historical Resources Impact Assessment of a residential development proposed by Nu-West Development, in Strathcona Cell G, was carried out by Lifeways of Canada, Limited.

Techniques employed included foot traverses, backhoe testing and shovel testing by a crew of from one to three people. A total of one historic and seven prehistoric sites were recorded in the two sections examined. The prehistoric sites consist of two isolated finds, two kill sites, two buried sites, and one campsite.

In Section 2 additional work is recommended for two sites within the development area, the historic site and the buried prehistoric site

EgPn-296. While EgPm-234 is located within the development, additional work is not recommended. The two remaining sites, EgPm-235 and 236 are also recommended for additional work but the areas located outside of this development are not of concern to this project.

In Section II subsurface testing of the surface site failed to produce any Historical Resource data and the site is of no further concern. The two kill sites are of further value. In each case, they appear to be restricted in size and we recommend limited work to mitigate potential impact.

81-206	J. Damp Lifeways of Canada Ltd.	Jaeger Holdings, Subdiv., Strathcona Heights Cell G, Calgary

An Historical Resources Impact Assessment of a residential development in Strathcona, Cell G, proposed by Jaeger Holdings (Calgary) Ltd., was carried out by Lifeways of Canada Limited.

Field techniques employed include foot traverse, backhoe testing and shovel testing by a crew of three. The survey resulted in the discovery of a single prehistoric site (EgPn-292). The site is comprised of a sparse scatter of stone artifacts and a few pieces of fire modified rock. Three shovel tests on the site failed to provide additional data.

Given the above results, additional work is not recommended.

81-207	S.G. Van Dyke Lifeways of Canada Ltd.	Gulf Canada Resources, Pipeline, Big Valley

Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of lands projected for development as a part of the Big Valley Enhanced Recovery Project.

Five prehistoric sites were identified along alignments which form a part of the enhanced recovery system. These include a major bison kill site (ElPe-2), three small finds (ElPe-12, ElPe-13, and ElPe-14) and a single isolated find (ElPe-15).

One of the prehistoric sites exhibits sufficient cultural material to warrant serious concerns. ElPe-2, a major kill, was originally recorded by the Provincial Museum in 1971.

It is recommended that the site area be given a wide berth, perhaps looping a north south production line to a well located to the east and utilizing a new right-of-way from that well to the wellsite of concern on the high terrace edge. Should avoidance not be possible, the right-of-way in the site area is recommended for testing in order to determine the nature of artifactual and material distribution across the fan deposits below the kill site and along the right-of-way.

Three small finds, ElPe-12, ElPe-13, and ElPe-14, produced interesting but highly diffuse scatters of archaeological materials in small numbers. The diffuse nature of the find suggests little concern. It is recommended that the above site areas be released for development without further work.

A single isolated find, ElPe-15, consisted of a quartzite cobble core. The find contains little intrinsic value and it is recommended that the site area be released without further work.

81-208	J.M. Calder Lifeways of Canada Ltd.	Town of Sundre, Pipeline & Sewage lagoon, Sundre

In early December 1981, an Historical Resources Impact Assessment of the town of Sundre's proposed sewage treatment plant, access road and pipeline was carried out. The study area, a flat flood plain of the Red Deer River, for the most part is characterized by high archaeological potential.

A systematic foot traverse was carried out, all exposures were examined, and forty backhoe tests were excavated. No cultural materials were observed.

In the consultant's opinion, no historical resources will be impacted during project construction and no further historical resource studies are warranted.

PERMIT NO.	PERMIT HOLDER	PROJECT
82-1	S.G. Saylor Ethos Consultants Ltd.	City of Medicine Hat Subdiv., Medicine Hat

An Heritage Resources Impact Assessment was conducted by the author in April, 1982 within the proposed 1982 Brier Park Subdivision. The entire development area was examined on foot, all surface exposures were viewed and a series of shovel test holes excavated. A single cultural item was recovered from the surface of the site; and all test excavations were negative. Also, it was noted that the vast majority of the developmen zone had been disturbed prior to archaeological investigations. In view of only one isolated find recorded, the negative subsurface testing results and the substantial amount of disturbance, it is recommended that development be allowed to proceed.

82-3	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	Transalta Utilities, Transmission line/ tower pads, Devon

An Historical Resources Impact Assessment of the proposed TransAlta Utilities Corporation Keephills to Ellerslie 500 kV Transmission Line resulted in the identification of fourteen historical resource sites. Nine sites are surface scatters, three sites are isolated finds, and two sites are campsites.

Of the fourteen identified sites, eight (N=8) will not be impacted by erection of towers. The remaining six sites will have towers erected within the known site areas. These sites were assessed on the basis of amount and nature of cultural material exposed on the ground surface or encountered in shovel tests at the proposed locations of the towers. The investigations indicate that erection of the towers will not cause any damage to the identified sites. No further studies relative to the proposed project have been recommended.

Because construction was imminent within the sections reported upon here, TransAlta Utilities Corporation was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture, on the basis of the results of the field studies.

82-4	R.J. Balcon ARESCO Ltd.	Gulf Canada Resources, Mitigation FgQg-2, Robb

At the request of Gulf Canada Resources Incorporated, ARESCO Ltd. undertook the mitigation of a prehistoric site near Robb, which is located on the Shaw-Mountain Park segment of the Gulf Foothills gas-gathering system. Site FgQg-2 was test excavated and later surface collected.

A total of 46 artifacts, the majority of which are quartzite debitage, have been collected from the site. No time diagnostic artifacts were found, nor were any features observed.

The mitigative measures that were undertaken were deemed adequate and the pipeline has been constructed through the site.

82-5	J.W. Pollock Settlement Surveys Ltd.	Alberta Power Ltd., Transmission line, Robb

An archaeological survey of proposed 144 kV Alberta Power transmission line between the existing Parsons Creek Substation 718S and a proposed 144 kV Substation in the Hangingstone River area, failed to disclose any sites of historical significance.

As no historical resources sites were discovered on the proposed route it is recommended that the project be given final and complete clearance to proceed without further regard to historical resources.

82-6	J.M. Hunt ARESCO Ltd.	NOVA, Pipeline, Mitigation, Jenner

In March, 1982, the impact mitigation of EeOo-16, a possible cairn site located on the proposed Alaska Highway Gas Pipeline right-of-way, was completed. During November 1981, two units were dug at the site (under permit 81-202), to test for cultural materials, with negative results.

An additional two 1 x 1 m units designated 3 and 4 were excavated in March, to a depth of 20 cm. The units were dug in two 10 cm levels to a depth of 20 cm below surface. All dirt was screened using a 3/8" mesh.

One piece of bone was found approximately 5 cm below surface in the most southerly of the two units. This has been identified as a tarsal bone associated with a cow, or possibly bison. No other materials were located.

It is believed that EeOo-16 represents a natural feature, though it is possible existing rocks were rearranged or utilized in some way by man. There is no tangible evidence however, that the feature is related to a cultural event. This scatter of rock is located downslope (8 - 10 m) from the excavated cluster. The site is more than likely an outcrop of glacially deposited materials. Similar boulder scatter can be noted on many of the knolls in the area surrounding EeOo-16. No further work is required at the site.

Two tipi ring sites (EeOo-64 & 65) are also located on the proposed Alaska Highway Gas Pipeline. The features at these sites were fenced in March 1982 by personnel from Foothills Pipelines to ensure their protection from impacts. No further work is required at the two sites, given they remain undisturbed.

82-7	B.W. Wright ARESCO Ltd.	Wimpey Western Ltd., Mitigation EgPn-146, Calgary

In May and June, 1982 ARESCO Ltd. conducted a program of mitigation at EgPn-146, a buried multicomponent campsite to be impacted by residential subdivision construction. The program consisted of 100% excavation of three tipi rings and excavation of 24 - 2 x 2 m units to depths of up to 90cm below surface.

The site consists of at least 28 surface tipi rings with Late Prehistoric components represented by ceramics and a Besant projectile point. Tools and debitage were quite scarce with fire broken rock comprising 91% of the cultural material recovered.

Two small basins containing a 10 - 15cm thick stratum of volcanic ash were excavated. It is thought that three buried components exist here with one component above the ash and two below, however stratification is not readily apparent and it is unlikely that a precise separation of components will be obtained. Component 2 above the ash was found to contain a Bitterroot projectile point while components below ash contain Pelican Lake or Pelican Lake-like projectile points. In addition one Salmon River side notched "fishtail" point was also recovered below ash.

Lithics from the basin areas show high frequencies of silicious siltstone with quartzite and cherts ranked second and third. Seventy five tools were recovered.

Chemical residue analysis undertaken on a sample of 32 stone tools has suggested that butchering and hide processing activities were concentrated in one basin area while tool making is indicated in the other.

82-8	S.G. Saylor Ethos Consultants Ltd.	CFB Suffield, Impoundments: reservoir, Medicine Hat

During mid-April of 1982 Ethos Consultants Ltd. was commissioned by Alberta Culture to examine a proposed water reservoir to be built by the Department of National Defense south of Ralston, Alberta. The entire quarter-section within which the reservoir was to be built was examined by a series of foot traverses. Also, the hill upon which the reservoir was to be located was shovel tested. One archaeological site (EaOs-5) was recorded, but was determined to be 200 metres south of the development area. Development would not damage the site, and was accordingly recommended to proceed.

82-9	D.N. Steer DS Consulting	Esso Resources Canada Ltd., Pipeline, Crimson Lake

A Heritage Resources Impact Assessment of three short sections of gas pipeline right-of-way in the South Ferrier Field southwest of Rocky Mountain House was completed for Esso Resources Canada Limited. The assessment involved a detailed surface reconnaissance of the right-of-way in an attempt to locate historical resource sites and an archival file search to determine if previously recorded historical resources were located in the study area.

Despite a complete field examination of the pipeline alignment no sites were located. One previously recorded prehistoric site in the immediate area was noted but found to be situated some distance from the right-of-way. Taking into account the negative results of the present study it is recommended that further archaeological work is not necessary for the proposed development project.

82-12	J.W. Pollock Settlement Surveys Ltd.	Nova, Pipeline, Rocky Mt. House

Settlement Surveys Ltd. conducted an Historical Resources Impact

Assessment on the proposed Edson Mainline Loop for NOVA, between May 3rd and 5th, 1982.

Two small prehistoric archaeological resource sites were found at the Swan Creek crossing. These are: FaPs-1 and FaPs-2.

Both sites consist of a number of flakes which were found eroding out of erosional bank facies or surface finds. Subsurface testing at each site substantiated the fact that the two zones were not heavily utilized as habitation sites and were probably only temporary campsites utilized by small groups/individuals travelling from the Prairie Creek lowlands to the Swan Lake uplands. Their presence at the Swan Creek crossing permits one to conclude that this valley was probably utilized as a main access route from the lowlands to the uplands in this area and that further sites probably exist on the various terraces from the Prairie/Swan Creek confluence to and around Swan Lake.

Both sites will be impacted by the 'reroute' from the R.O.W. on the east side of the Swan Creek crossing. Because of the apparent lack of diagnostic artifacts and the thin scattering of material along with negative subsurface testing at the sites, it can be concluded that they are of limited scientific value. Consequently, no further mitigation is warranted.

82-15	S.G. Saylor Ethos Consultants Ltd.	Howard Jones/Realty World, Subdiv., Medicine Hat

An Historical Resources Impact Assessment has been undertaken at the proposed Howard Jones/Realty World housing subdivision in Medicine Hat.

Subsurface shovel testing was done following the initial surface reconnaissance. Each test hole measured approximately 0.35 square metres, and was excavated downward to a point at which it was certain to have penetrated the Ah and B horizons. Test holes were placed in all lots, and in some instances adjacent to surface artifact recoveries.

Four prehistoric archaeological sites were recorded within the proposed development zone. Sites EaOp-33 and 34 were assessed to be of low potential, and no additional work is recommended. Sites EaOp-35 and 36 were assessed to be of average potential. The developer has suggested that development plan alterations could avoid EaOp-35, but not EaOp-36.

Accordingly, EaOp-36 was test excavated. It is recommended that the development plans indeed be altered to avoid EaOp-35, and that assessment and test excavation has been sufficient to avoid damage to the remaining historical resources.

82-16	J.W. Pollock Settlement Surveys Lts.	Nova, Pipeline (gas), Smoky Lake

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on the 6.5 km Barich Lateral on 10 May 1982.

The entire R.o.W. was inspected by 'zig-zag' foot traverses. Subsurface testing was implemented on topographic high areas every 10 and every 100 m on: a) cultivated fields; and b) valley sides, and organic valley floors. Surface inspection was maintained on recently plowed fields.

No archaeological resources sites were discovered within the R.o. W. As no historical resources sites were discovered within the study area, it is recommended that the development be allowed to proceed without further concerns in regard to historical resources.

82-18	B.M. Newton Settlement Surveys Ltd.	Bruyer Consulting/Local Dev. Group, Subdiv., Hinton

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on property in Hinton, Alberta.

Fieldwork consisted of a program of systematic and judgmental subsurface testing of the property in general with particular emphasis on the surface and subsurface survey of the banks and terraces of Hardisty Creek, Thompson Lake and other ridges or topographic highs on the property.

The survey resulted in the discovery of 4 prehistoric archaeological resources sites consisting of 2 small prehistoric findspots (FiQj-12, 13) of limited scientific value and two prehistoric campsites (FiQj-11, 14). Testing at these last two sites showed them to be of value and further work is recommended at the above sites.

In addition to the prehistoric finds, historic sites or features were encountered consisting of two former small sawmill sites, and a log building.

It is recommended that the subdivision be cleared for historical resources concerns except for the two small areas containing prehistoric sites FiQj-11, 14 where some modest mitigation work is suggested.

82-19	J.W. Pollock Settlement Survey Ltd.	Alberta Power Ltd., Transmission line, Spirit River to Fairview

An Historical Resources Impact Assessment was conducted by Settlement Survey Ltd. on portions of the Clairmont Lake to Friedenstal 144 kV Transmission Line. The field survey resulted in the discovery of two archaeological resources sites consisting of one isolated prehistoric findspot (GlQp-4) of limited scientific value and one prehistoric campsite (GlQp-5). Testing at this site showed it also to be of limited value and no further work is recommended at any of the above sites.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the transmission project be cleared for historical resources concerns.

82-20	M.R.A. Forsman Archaeological Survey of Alberta	Historic testing, Frank, Leitch Collieries & Stephansson House

Archaeological surveys under the direction of M. Forsman, Historic Sites Archaeologist of the A.S.A., were carried out at Stephansson House, Leitch Collieries and Frank Slide during the first week of May. The studies focused on site areas scheduled for visitor service developments, such as access roads and parking lots. These proposed developments were of small scale. Cultural remains were recorded at all three locations, but only those at Leitch offered any potential for further contributing to a local understanding of site history. The remains exposed at Leitch, however, were of only minor significance in relation to the industrial activity carried out at the site. These features have now been extensively mitigated and pose no further concerns. Some monitoring at Leitch during construction of the septic field and parking lot further ensured the protection of any unknown historical resources which might be exposed. None were found.

82-21	J. Rod Vickers Archaeological Survey of Alberta	Head-Smashed-In Campsite (DkPj-2) HRIA.

An Historical Resources Impact Assessment of a proposed roadside pull-off, boardwalk, and trailer pad at Head-Smashed-In Campsite was conducted in May 1982. Seven 0.5 x 0.5m shovel tests were excavated in the small (50 x 50m) development area. Tests were excavated to 40 - 60 cm BS and all matrix was screened through 1/4" mesh.

All tests yielded cultural material; primarily butchered bone, FBR, and shatter. No formed or diagnostic tools were recovered. Cultural material was confined to the upper c. 20 cm BS in unstratified aeolian silts.

Since the development area is peripheral to the main campsite deposits, and since development plans entailed laying a gravel pad to protect the site surface, no further work was recommended.

82-25	D.N. Steer DS Consulting	PanCanadian Petroleum Ltd., Vulcan-Champion

In May 1982 DS Consulting carried out a Heritage Resources site survey of twenty-two small coal exploration leases of PanCanadian Petroleum Limited, in the Vulcan-Champion area of southern Alberta. Surface examination and subsurface testing of the proposed development areas revealed one historical resource site. The site (EcPg-5) was prehistoric in origin and consisted of a very light surface scattering of lithics and bone fragments. The remains were located in the northeast quadrant of coal exploration lease VU-10-82. Investigation, recording and assessment resulted in the conclusion that the site was not of significant value to warrant further concern. No further archaeological work is recommended for the site or the other lease areas beyond that which has been conducted to-date and documented in this report.

82-26	J.W. Pollock Settlement Survey Ltd.	NOVA, Pipeline (gas), Heart River to McLennan

Settlement Surveys Ltd. conducted an Historical Resources Impact Assessment on the proposed R.o.W./laterals between 19 and 27 May 1982.

Fieldwork consisted of a pedestrian survey complemented by both random and systematic subsurface inspection.

The survey resulted in the discovery/recording of 16 archaeological resources sites and 3 historical sites within and/or adjacent to the proposed corridor.

Two of the archaeological sites, GkQk-1 and GkQk-5, appear extensive and will require further testing or avoidance. Two of the 3 historical sites are cemeteries and will require avoidance.

The remaining 14 archaeological sites and one historical site are of limited scientific value and no further work is recommended further to their documentation in this report and the completion of the requisite archaeological site report form.

82-28	A.L. Bryan Archaeological Researches International	Hamilton Lake Developers, Subdiv., Vilna

An intensive archaeological reconnaissance was made of approximately 80 acres of land which lies south of the southern shore of Hamilton Lake. Examination of all exposures and excavation of 56 shovel tests failed to reveal any evidence of prehistoric or historic sites. It is recommended that no further mitigative measures are necessary.

82-34	M.A. Kennedy Lifeways of Canada Ltd.	Cohas, Evany & Partners, Subdivision: Shopping mall, Calgary

An Historical Resources Impact Assessment was conducted of a proposed mall development in Calgary.

The survey was conducted using two methods of investigation. (1) A systematic traverse with shovel testing at regular intervals was conducted in the cleared field between 52 Street and the large central slough, as cultural material had been observed during the overview scattered over the land surface. At each find spot, a minimum of four shovel tests were dug to C horizon. (2) In the remaining fields the terrain was stratified into high, moderate and low potential areas, upon the basis of topography and proximity to sloughs.

Reconnaissance of the study area revealed six prehistoric sites. No sites had been previously recorded in the proposed development vicinity. Five of the six sites identified were either small finds or isolated (single artifact) finds. It is suggested that there are no further concerns for these features. Only one site, EgPl-8 disclosed a variety of cultural material.

All sites occur in extensively cultivated lands. EgPl-8 appears scattered across a previously cultivated, now surface stripped field. It is the report author's opinion that disturbance by the above activities has already seriously impacted and dispersed this site. Consequently, no further work is recommended.

82-35	B.M. Newton Fedirchuk McCullough & Assoc. Ltd.	County of St. Paul, Subdiv./refuse dump/road, St. Paul

An Historical Resources Impact Assessment was conducted by Fedirchuk McCullough & Associates Ltd. for the County of St. Paul No. 19. A program of systematic subsurface survey with particular emphasis on areas adjacent to sloughs, augmented by examination of surficial exposures was employed. The survey failed to reveal the presence of any prehistoric, historic or palaeontological sites on the property.

On the basis of the negative results of the survey, it is recommended that the development of this section of the proposed subdivision be allowed to proceed without further concern for historical resources.

82-36	R.K. Brulotte University of Alberta	Research, Test excavation, Racehorse Creek

The scarcity of fossil pollen locations which would be ideal paleoenvironmental indicators has always led researchers in mountain regions to utilize other available data for their environmental reconstructions. Such was the case with my thesis project where zooarchaeological sites became of primary importance. Two such sites, the Racehorse Rockshelter and the Daisy Creek Site, were excavated in the summer of 1982. These sites were the only ones of many surveyed and investigated in the Racehorse Creek drainage which yielded a large enough faunal sample in conjunction with human artifacts to be of any use to the project. A date of 3040 ± 130 BP (Beta Analytic) on a charcoal sample from the middle level of the Rockshelter indicates that the deposit may span from the present to ca. 7000 BP. The majority of the faunal remains can be attributed to natural casues as well as carnivor and predator activity in the immediate region of the shelter. Over twenty-five species have been identified and more are yet possible. A taphonomic and MNI investigation is underway.

No dates have yet been received for the Daisy Creek Site, an open air site about two kilometers distant from the Racehorse Rockshelter. Daisy Creek primarily yielded large mammal remains including bison and possibly deer and elk. The site was specifically productive in artifacts, activity areas, and different types of raw lithic materials all of which are extremely useful in illuminating the purpose of occupation and habitation in the Racehorse Creek drainage.

82-40	J.W. Ives Archaeological Survey of Alberta	Geological Sources of Beaver River Sandstone

This project is reported upon in greater detail elsewhere in this volume. In July of 1982, Beaver River Quarry (HgOv-29) was re-examined by Ives and Fenton (Alberta Geological Survey, Alberta Research Council); this was accompanied by survey of portions of the Athabasca, Muskeg, MacKay and Firebag Rivers. Fieldwork at Beaver River Quarry supported the conclusion that the Beaver River Sandstone unit present there has not been glacially transported. Sampling of this unit along the perimeter of borrow pit near the site also indicated that Beaver River Quarry was not likely the source for significant quantities of high quality Beaver River Sandstone for stone tool manufacture. No additional sources of Beaver River Sandstone were discovered on the lower Muskeg and MacKay Rivers or on the middle reach of the Firebag River. At HhOv-55, however, an *in situ* unit of Beaver River Sandstone was discovered within the McMurray Formation. HhOv-55 is immediately south of the Cree Burn Lake Site (HhOv-16), on the right bank of the Athabasca River. The chief implication of this finding is that the "target zone" for potential Beaver River Sandstone sources must be broadened to encompass McMurray Formation exposures.

82-41	J.W. Ives Archaeological Survey of Alberta	Alsands Lease and Test of HhOv-73, Ft. MacKay

Investigations under this permit had three objectives. First, the field party completed surface survey on the cleared portion of the initial five year mine site of the former Alsands lease. This project was initiated in 1981 (Ives 1982). Second, initial surface survey took place on selected portions of the previously cleared plant site. And third, Ives and LeBlanc undertook evaluative excavations at HhOv-73, the lease site which had previously yielded two microblade cores (Ronaghan n.d.).

The second year of survey on the mine site was not as productive in that only four sites (HhOu-31 HhOu-32, HhOv-140 and HhOv-141) were discovered during the examination of fourteen terrain features. HhOu-24, discovered in 1981, was systematically shovel tested. Eight terrain features were examined on the plant site, and three prehistoric sites (HhOv-142, HhOv-143 and HhOv-144) were discovered. All sites produced limited collections.

HhOv-73 has been named the Bezya site. It was topographically mapped, with excavations taking place on the northern, central and southern portions of the ridge. A total of twenty-four square metres were excavated. In the northern excavation, further evidence of microblade technology was recovered. The assemblage included an additional, complete, black chert microcore, 81 microblades and microblade fragments and one notched black chert burin. Extensive refitting has been possible. Two other microcores have been reconstructed, and trimming flakes from preliminary core shaping have been refitted. Some microblades have been refitted to the fluted faces of microcores. Several ridges flakes and possible core tablets are present. Presently, it is not possible to date this episode of activity, and initial indications are that this may remain impossible. Other low density concentrations of Beaver River Sandstone debitage suggest multiple occupation of the ridge itself. Detailed analysis of the 82-41 collections is in progress.

82-42	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Esso Resources Canada Ltd., Drill Sites, Ft. MacMurray

Fedirchuk McCullough & Associates Ltd., on behalf of Esso Resources Canada Limited, conducted a post-clearance audit of Bituminous Sands Leases 29, 31, 32, and 78 wherein new core-hole drilling access rights-of-way and core-hole drilling sites not situated in wetland areas were inspected for prehistoric sites after the core-hole lease evaluation program had been completed.

No prehistoric sites were identified in the areas requiring assessment. Two prehistoric sites, HgOu-1 and HgOu-2, tentatively classified as isolated ifnds, were found en route to the zones requiring assessment. The sites are of unknown value and in the event that they are to be disturbed by future development, an extensive shovel testing program is recommended to determine their potential to contribute new scientific knowledge and/or their appeal to the public with respect to enjoyment and education.

The study results indicate that in the boreal forest regions post-clearance studies of linear projects which have minimal associated disturbance factors are effective. In the event that the lease areas are to be fully developed it is recommended that an historical resources impact assessment be conducted.

82-44	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	PanCanadian Petroleum Ltd. Pipeline (gas), Bow City

An Historical Resources Impact Assessment was conducted of the proposed PanCanadian Petroleum Limited Entice Natural Gas Pipeline, scheduled for development in southern Alberta.

A pedestrian survey and subsurface testing resulted in the identification of one historical resource site. Site EiPh-4 is a small surface campsite located adjacent to small coulees in a ploughed upland area. Recording, photographic documentation, and the collection of a stone core are considered to be sufficient mitigation.

Based on the results of this study, it is recommended that PanCanadian Petroleum Limited be granted historical clearance by the Archaeological

Survey of Alberta, Alberta Culture.

82-45	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	Mutrie Wishart Env. Consult. Ltd., Pipeline: Countess - Leckies, Bow City

An Historical Resources Impact Assesment of three proposed gas gathering systems, scheduled by Cardo Canada Limited for development in southern Alberta, resulted in the identification of nine historical resources sites.

Three historical resources sites were located within or near the proposed Countess-Leckie Gas Gathering System rights-of-way. Of these, EdPb-6, an isolated find, will be subject to primary impact. The remaining sites are located outside the proposed development zone and will not be subject to impact. No further study has been recommended.

Six historical resources sites were located in or near the Bow City Gas Gathering System rights-of-way. EdPc-27, a stone circle site, will be subject to primary impact. It was recommended that the proposed right-of-way be moved further to the east so as to avoid the site. This was subsequently done and the new right-of-way was examined for historical resources with negative results.

The remaining sites are situated outside the proposed development zone and will not be subject to primary impact. No further studies have been recommended if construction activities are confined to the proposed rights-of-way.

No historical resource sites were located during the Historical Resources Impact Assessment of the proposed Countess-Leckie/Bow City Joint Venture Transmisssion Line to NOVA. No further studies have been recommended if construction activities are confined to the proposed rights-of-way.

82-48	R.J. Balcom ARESCO Ltd.	B.P. Canada Ltd., Wolf Lake Project

Due to the proposed development of bitumen extraction facilities by B.P. Canada Ltd. in the Wolf Lake - Marguerite Lake region, ARESCO Ltd. has conducted an historical resources impact assessment of selected portions of the 324 hectare parcel. The areas inspected by ARESCO Ltd. included two ridges adjacent to an unnamed creek and several small knolls.

No archaeological sites were recorded and ARESCO Ltd. has recommended that development be allowed to proceed. The Archaeological Survey of Alberta has concurred with this recommendation.

82-53	S.G. Van Dyke Lifeways of Canada Ltd.	Canadian Hunter Exploration, Gas pipeline, South Wapiti

On June 7th and 8th, 1982 two archaeologists under permit from the Archaeological Survey of Alberta carried out a monitoring programme involving five creek crossings within the South Wapiti Gas Gathering System. The gas gathering system was constructed during the winter of 1981/1982. The monitoring programme was carried out in order to determine whether prehistoric, historic or palaeontological sites were present at the crossings.

Archaeological studies were carried out by Lifeways of Canada Limited on behalf of Canadian Hunter Exploration Limited. The field study was staged out of the Canadian Hunter camp located at the South Wapiti Gas Plant. Access to the five locations was by 4-wheel drive vehicle, ATV and foot. Areas examined involved the cleared rights-of-way over a distance of approximately 300 metres at each of the crossings. The total area examined was approximately 1500 metres in length, 18 metres in width and 2.7 ha in area.

No prehistoric, historic or palaeontological sites were observed at the crossings.

82-55	J.W. Ives Archaeological Survey of Alberta	Alberta Forest Service, Campground, GeOv-4 impact, Barnegat

This permit involved an Alberta Forest Service campground to be situated on the north shore of Shaw Lake, east of Lac La Biche. Systematic shovel testing was undertaken in June within the development area, but no prehistoric sites were discovered. It was recommended that the project be allowed to proceed.

82-56	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	PanCanadian Petroleum Ltd., Gas Pipeline, Buffalo

An Historical Resources Impact Assessment of the proposed PanCanadian

Petroleum Limited Atlee-Buffalo Forty-Two Well Tie-In and Access Road scheduled for development in southern Alberta resulted in the identification of twenty-eight historical resource sites.

One site, EeOr-83, is an isolated find. Two sites (EeOr-80, EeOr-81) are abandoned farmsteads. The remaining twenty-five sites (EeOq-45 - 66, EaOr-82, 84, 85) are stone feature sites. Potential conflicts between these historical resources sites and the proposed rights-of-way have been resolved by relocation of the rights-of-way. Relocated rights-of-way have also been examined to ensure that no conflicts with historical resources sites exist. No further studies have been recommended if construction activities are confined to the proposed rights-of-way.

Based on the results of this study, PanCanadian Petroleum Limited was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-57	S.G. Van Dyke Lifeways of Canada Ltd.	Gulf Canada Resources Ltd., Pipeline (gas): Gilby to Rimbey

On behalf of Gulf Canada Resources Inc., Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of the proposed Gulf Rimbey Pipeline right-of-way and lateral extensions. Studies, consisting of foot traverses, shovel testing, site specific assessments and site recorded, were carried out on June 17th and 18th, 1982 and again between October 12th and 14th, 1982.

Ten prehistoric sites were identified. Three of these were determined to have values. Assessment of these three sites, FdPn-3, FdPn-5 and FePm-1, by means of between one and four, 1x1 metre tests, demonstrated archaeological significance for only one of the sites, FePm-1. FePm-1 is a campsite which yielded in excess of 60 quartzite flakes. The site is located in an area of high archaeological potential--a knoll adjacent to a lake.

It is recommended that, if feasible and/or practical, the site area be avoided by means of altering the alignment to the other side of the existing HBOG pipeline alignment at any point north of the site area.

Alternatively, it is recommended that 12 additional square metres be excavated within the immediate vicinity of the original en-bloc test.

At the time of this writing, Gulf Canada Resources Inc., has indicated that such a realignment is feasible and practical.

82-59	J.M. Quigg Ethos Consultants Ltd.	AESL, Pipeline, Brooks

As part of the follow-up from the initial Historical Resource Impact Assessment for the Deadfish Water Diversion Project, conducted during the summer of 1981, a ground verification of the construction zone was undertaken on June 9, 1982. At that time a small cairn (EgOx-63) was discovered inside the right-of-way (R.O.W.) of the water pipeline due to minor alterations in the R.O.W.

This cairn (EgOx-63) contained only minimal amounts of cultural material and given the type and quantity of information recovered during these investigations, it is recommended that no further work is necessary. Ethos Consultants Limited have mitigated the site and thus recommend the development can proceed.

82-60	S.G. Saylor Ethos Consultants Ltd.	Newlake Resources, Pipeline, Jenner

An Historical Resources Impact Assessment was conducted for approximately 2 miles of the Newlake Resources Ltd. pipeline in the vicinity of wellsite 6-33-21-W4. Archaeological site EeOt-13 was found to be near the proposed pipeline route, but relocation was successfully conducted and no further work is recommended at this location. However, it is hoped that future energy development in the region will involve an H.R.I.A. in order to avoid damage to the numerous archaeological sites known to exist in the region.

82-63	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Esso Minerals Canada Ltd., Coal lease, Hinton

A preliminary overview and reconnaissance of Esso Minerals Canada Limited Hinton East Coal Properties was conducted for the purpose of determining the historical resources potential of the area. An extensive review of sites previously recorded along the eastern slopes of the Rocky Mountains in the vicinity of the study area suggests that the margins of streams and lakes have a high potential for prehistoric sites.

A preliminary field reconnaissance of the Hinton East Coal Properties indicates that the lease area has a high potential for prehistoric sites, particularly in the vicinity of McPherson Creek. Based on the results of this study it is recommended that Esso Minerals Canada Limited conduct a complete Historical Resources Impact Assessment of the Hinton East Coal Properties.

82-64 R.J. Balcom Shell Canada Ltd./
ARESCO Ltd. Associated Kellogg Ltd.,
Scotford Mitigation

Two prehistoric campsites to be impacted by construction of a gas pipeline near Fort Saskatchewan, Alberta were tested via ten 1 x 1m units at each.

FkPg-6 yielded 338 pieces of lithics (mostly petrified wood), bone, fire broken rock and pottery. Based upon the presence of pottery an occupation during the Late Prehistoric Period is postulated.

FkPg-62 yeilded 191 pieces in addition to the 9 collected from shovel testing. The assemblage consisted of lithics (mostly quartzite), bone and fire broken rock. No date could be assigned to the site.

82-65 J.M. Hunt Westmin Resources,
ARESCO Ltd. Pipeline, St. Paul

In June 1982, ARESCO Ltd. completed an Historical Resources Impact Assessment of the proposed Owlseye pipeline in east central Alberta.

The field survey consisted of a surface reconnaissance of the entire pipeline route. Shovel tests were dug in all uncultivated areas, all potential areas and at all sites recorded.

Nine prehistoric sites were recorded. Four of these were represented by isolated lithics, and five by more extensive lithic scatters. None of the sites have been recommended for further work on the basis of low artifact density and/or their disturbed contexts.

82-67	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	Transalta Utilities Corp., Transmission line, Jenner

An Historical Resources Impact Assessment of the proposed TransAlta Utilities Corportation Ware Junction to Jenner, 240 kV Double Circuit Transmission Line (Stage II), examined the western 22 kilometres of the total 70 kilometre project.

Three prehistoric sites (N=3) were located. Two sites (EeOv 36 and EeOv 37) are stone circle sites; one site (EeOx 21) is a campsite. Sites EeOv 36 and EeOx 21 are located within the proposed right-of-way. EeOv 36 is, however, between two tower locations and will not be affected by construction activities. EeOx 21 is of low significance, so that photographic documentation and recording are considered sufficient mitigation. Site EeOv 37 is located outside the proposed right-of-way and will not be subject to direct impact.

One historic Twentieth Century farmstead was also located (EeOw 2). It is located outside the proposed right-of-way and will not be subject to direct impact.

No sites of palaeontological significance were located along the route examined for Stage II.

82-68	T.C. Losey Historical Resources Consultant	Ron Willows Development, Subdiv., Winfield

An Historical Resources Impact Assessment of a proposed cottage resort located on the southeast shore of Buck Lake, Alberta was conducted on 24 June 1982. A total of 101 subsurface tests along c. 7.5 km of foot traverses succeeded in locating a single prehistoric site designated FfPq-2 located on a former shoreline, 1.5 m above modern Buck Lake. The site is one of two known in the FfPq Borden Block and is comprised of a 2.0 kg subconical grooved stone maul and a triangular retouched flake. Excavation of 20 additional tests as part of the normal site assessment procedure failed to produce additional material. Artifacts are catalogued and filed with the Archaeological Survey of Alberta. No further study is recommended at the site.

82-69	R.J. LeBlanc Archaeological Survey of Alberta	1982 Field Programme on Lesser Slave Lake

A short (2.5 weeks) field programme was undertaken on Lesser Slave Lake during July, 1982, as part of a continuing project dealing with the prehistory of this area of northern Alberta. The work included mapping and testing of one site (GjPx-6) and mapping of another (GiQa-3). Both are previously tested (1980 - 81) prehistoric sites located on the modern shoreline of the northwest corner of the lake in Hilliard's Bay Provincial Park.

After completion of the mapping, the testing at GjPx-6 involved excavation of nine square metres on the west (5 m^2) and east (4 m^2) portions of the site, and additional shovel testing to determine the site's limits. The testing in the west area was largely unproductive, but the east side produced a hearth and several artifacts which are comparable to assemblages recovered during previous field seasons. The shovel testing indicated that the site is approximately 150m long, 29m wide and is oriented with the long axis parallel to the shoreline.

82-70	B.F. Ball Archaeological Survey of Alberta	Research, Excavation ElPf-1, Dry Island Buffalo Jump Prov. Park

The 1982 archaeological investigations conducted within the Dry Island Buffalo Jump Provincial Park have identified the presence of a late dating buffalo jump site and habitation areas located on the west side of the Red Deer River valley approximately 65 kilometres southwest of Red Deer, Alberta. The buffalo jump site appears to have been utilized for the past 2000 years, with the major use occurring in the last 500-1000 years. It seems most likely that the jump site was used on an intermitent basis, and formed part of a seasonal round much like that documented for the Blackfoot who occupied the study area at time of contact.

Survey data gathered from the valley floor and upland plateau indicate numerous habitation areas, some of which were sampled by shovel hole test pit excavation. Larger test excavation units were utilized in the valley to determine the character of these habitation and processing areas. The jump site was tested using four column samples ranging in depth from 0.5 to 1.3 metres, and containing from one to three lenses of bison bone. Column and bulk samples were processed using a flotation device so as to facilitate as complete a recovery of materials as possible. Particular attention was focused upon the recovery of organic remains in an attempt to quantify the floral component of the local subsistence strategy and to assist in the assessment of the prehistoric floral regime of the area.

The results of the 1982 archaeological survey and excavation program help to place the Dry Island Heritage Resources within a spatial and temporal perspective of bison procurement in the parkland ecotone.

82-73	M.A. Kennedy Lifeways of Canada Ltd.	Canadian Superior Oil Ltd., Pipelines, Wardlow/M.D. Berry Ck.

Lifeways of Canada Limited was retained by Canadian Superior Oil Ltd. to conduct an Historical Resources Impact Assessment of their proposed Cessford area gas gathering system. Collectively, the proposed system affects approximately 52.5 km of land.

A foot traverse of all proposed lines was conducted by walking in a zig-zag path over the right-of-way and usually slightly beyond. Shovel tests were employed at all sites and in areas where ground cover concealed surface exposure.

Forty-three historical resource sites were located during the field reconnaissance; ten of those within the proposed rights-of-way were judged as significant in value. Close liaison was maintained between Canadian Superior Oil Ltd. and Lifeways of Canada Limited both during and after the field reconnaissance. The proponent is able to avoid all significant sites by rerouting or jogging their lines. Proposed realignments were surveyed by the Lifeways archaeologists. No historical resources will be impacted.

82-76	J.W. Ives Archaeological Survey of Alberta	Research, Birch Mountains Archaeological Study

Two tasks were completed for this permit. First, exploratory survey was undertaken on the unnamed lake at 57°42' latitude and 112° 03' longitude, on the east edge of the central Birch Mountains depression, in order to assess raw stone material use and to provide some indication of the frequency of prehistoric use of this lake. It is situated between the Athabasca River valley and the large lakes of the central Birch Mountains depression. Nine sites (HkPa-37-45, inclusive) were discovered at twelve stops. Assemblages associated with these sites consist of minor amounts of debitage. Frequent but ephemeral use of this lake may be inferred from these preliminary results. Second, a transect excavation at the North Clear Narrows Site (HkPa-6) was completed under this permit. This is the largest and most complex site on Clear Lake, and it occupies a strategic location. The transect was 25 centimetres in width and ran 30 metres across a flat clearing within an older spruce forest. Artifact densities ranged from low to moderately high. For both the transect excavation and the unnamed lake survey, raw lithic material usage is comparable to other Birch Mountains sites. Gray quartzite dominates. No diagnostic artifacts were recovered in either part of the fieldwork.

82-78	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	Canadian Pacific, Railspur, Ft. Saskatchewan

An Historical Resources Impact Assessment was conducted on the proposed Canadian Pacific Fort Saskatchewan rail spur. Fedirchuk McCullough & Associates Ltd. carried out the field work between July 16 and 26, 1982 which consisted of pedestrian traverse of the route in association with surficial inspection and subsurface testing. All sites located were tested by shovel in immediately adjacent undisturbed areas or at the locations where artifacts were found.

Six prehistoric sites were located during the survey. All contain surficial materials; one is extensive in size and contains suggestions of subsurface materials. This site, FkPh 64, is recommended for surface collections and evaluative excavations.

82-80	B.M. Newton Settlement Survey Ltd.	Transalta, Transmission Line, St. Albert

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. for TransAlta Utilities Ltd.

In addition to a program of systematic subsurface testing of the ROW in general, particular emphasis was placed on surface and subsurface survey of stream crossings and any sloughs encountered. In general, the systematic subsurface testing program involved excavation of 25 m^2 test pits at 100 m intervals along the ROW. Cultivated fields were not tested. Additional test pits were excavated at all stream/slough crossings to sterile subsoil. All of the test pits excavated along the ROW produced negative results.

The survey resulted in the discovery of four archaeological resources sites consisting of one isolated prehistoric findspot (FjPk-14) of limited scientific value and three prehistoric campsites (FjPk 11-13). Testing at these sites showed them to be of limited value as well and no further work is recommended at any of the above sites.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the transmission line be cleared for historical resources concerns.

82-81	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	NOVA, Pipeline, Bear River/Grande Prairie

An Historical Resources Impact Assessment was conducted of the proposed NOVA Bear River Natural Gas Pipeline, scheduled for development in northwestern Alberta.

A two-man field party conducted a pedestrian survey of the designated right-of-way as well as subsurface testing in areas of minimal exposure.

The survey resulted in the identification of one site, GjQu-1, which is an isolated find, consisting of a single quartzite spall located on the surface of a ploughed field. Photographic documentation, recording, and collection of the artifact have mitigated impact.

Based on the results of the Historical Resources Impact Assessment, it is recommended that NOVA, An Alberta Corporation, be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-83	M.A. Kennedy Lifeways of Canada Ltd.	City of Calgary, Mitigation, Fish Creek Prov. Park

The proposed route for the southern leg of the Light Rail Transit system to be built by the City of Calgary intersects Fish Creek Provincial Park, an archaeologically sensitive area. During a three day period in July 1982, Lifeways of Canada Ltd. conducted a test excavation program at EfPm-50, a prehistoric campsite located in Shaw's Meadow just west of Macleod Trail.

Two 1x2 m units were excavated to approximately 1 m below surface on the valley floodplain. Although three cultural zones were identified in the associated buried soils, very little cultural material was observed. Similarly, in two 1x1 m test units excavated on the higher edge terrace, cultural material was minimal.

EfPm-50 has been identified as a valley campsite. Butchered bone, fire broken rock and lithics have been observed in the site area during various archaeological inventories conducted in the south Calgary area over the last 15 years.

The scanty results of the July testing program suggests that the area within the proposed LRT right-of-way is a marginal activity area adjacent to more intense occupational and processing loci. These loci were likely removed or impacted by extensive historic land use activities undertaken in the last century at the site. As site significance of the remaining portions of EfPm-50 was low, no further conservation actions were recommended.

82-85	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	NOVA, Pipeline, County of Newell, Bassano

An Historical Resources Impact Assessment of the proposed NOVA Gem West Lateral Natural Gas Pipeline, scheduled for development in southern Alberta resulted in the identification of 2 historical resource sites.

Each site (EfPb-15 and EfPb-16) consists of a single stone circle, and both sites will be subject to either primary or secondary impact. It has been recommended that the proposed right-of-way be altered to avoid impacting the sites.

NOVA has altered the proposed right-of-way to avoid sites EfPb-15 and EfPb-16. The new right-of-way has been examined for historical resources with negative results.

Based on the results of this study, it is recommended that NOVA be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-86	R.J. Balcom ARESCO Ltd.	Foothills Pipelines (Yukon) Ltd., Alaska Highway Gas Pipeline

An Historical Resources Impact Assessment was conducted of selected segments of the proposed Zone 5 - Alaska Highway Gas Pipeline from Boundary Lake to Sundre, Alberta.

Approximately 56.6 km were inspected. A total of 16 archaeological sites were recorded. In addition, several previously recorded sites lying on or near the right-of-way were re-examined. Most of these were lithic scatters and several had quantities of black chert. At the time of this writing, it is not known exactly how many of the sites warrant further investigation. Further details will be forthcoming in the report.

82-90	M.R.A. Forsman Archaeological Survey of Alberta	Research, Excavations at Lille, DjPo-112

Michael Forsman, Historic Sites Archaeologist of the Archaeological Survey of Alberta directed excavations at the Lille townsite and Leitch Collieries in Crowsnest Pass. Excavations at Lille focussed on attempting to identify and characterize the nature of material culture differences between residential areas and economic levels of the community.

Excavations carried out in a number of refuse deposits reflected site abandonment and discard behaviour. Personal idiosyncrasies were represented in the material cultural assemblages associated with individual residences. Alcoholic beverage bottles varied widely in frequency from one house to another, but were generally less common in the assemblage from managerial level residences than the miners' cottages. Similarly, the quality of ceramic tablewares varied from one refuse deposit to another, but porcelain wares were more frequently associated with managers' houses than miners'.

Excavation at Leitch Collieries were mitigation oriented. Several subsurface depressions were exposed and found to be of little significance to the industrial activities carried on at the site.

82-91	B.W. Wright ARESCO Ltd.	Alberta Transportation, Test Excavation (EaOr-3), Medicine Hat

Exploratory excavations were conducted at EaOr-3, a multiple rock feature site located southwest of Medicine Hat, Alberta. EaOr-3 is defined on the basis of 9 tipi rings and one cobble hearth-like feature located on the prairie level overlooking a small coulee to the south.

The limited testing program at five tipi rings and the cobble concentration, all threatened by highway realignment, resulted in the recovery of 31 lithic cultural items.

Based on the recovery of a Samantha projectile point fragment and other evidence, EaOr-3 is interpreted as representing a short term Besant Phase occupation.

82-93	R.J. Balcom ARESCO Ltd.	Gulf Canada Resources, Yellowhead Monitoring

At the request of Gulf Canada Resources Inc., ARESCO Ltd. was retained on several occasions during the summer and fall of 1982 to monitor various phases of pipeline construction through the Yellowhead Mine and Townsite (FhQg-5 in the Robb area).

The construction phases that were monitored consisted of tree clearing, raking and brush burning, Chance Creek crossing, grading, trenching, pipelaying and backfilling. Although this was not a government requirement, Gulf Canada Resources Inc. requested that it be done to ensure that no features adjacent to the right-of-way be disturbed and so that additional information could be collected as it was made available.

The monitoring program was not only successful in that some artifacts were collected but none of the features adjacent to the right-of-way were damaged. It was apparent that two features near Chance Creek would have undoubtedly been destroyed in the process of crossing the creek had it not been for the presence of an archaeologist. These features appeared to be of little significance to the heavy equipment operators who would have preferred to have more room for maneuvering and for spoil piling.

82-96	H.W. Pyszczyk Simon Fraser University	Preliminary Investigations, Dunvegan

At the request of the Archaeological Survey of Alberta a crew of five members from Simon Fraser University began preliminary archaeological investigations in the late summer of 1982 at Fort Dunvegan, located along the Peace River near Fairview, Alberta. We concentrated our efforts on the early forts (1805-1877). Our objective was quite simple---to find and verify the exact location of the earliest fort which had not yet been archaeologically identified. Once this was done, we attempted to determine the archaeological integrity of the site, since it had undergone considerable post-occupation disturbance. The area was examined by test units and the entire surface area of the site was systematically surveyed to provide an indication of where major subsurface features were located.

The preliminary results from Dunvegan have helped outline the general boundaries of the early forts and have established the location of several buildings. In addition, a representative sample of artifacts were obtained. The archaeological integrity of the site varies; in some areas building sills are still intact even though the site has been plowed for several decades. These results, together with the surface survey, artifact analysis, and the available documentary data are presently being synthesized to provide recommendations for future work at Dunvegan.

82-97	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	NOVA, Gas pipeline, Lacombe

An Historical Resource Impact Assessment of the proposed NOVA Lateral Natural Gas Pipelines was conducted.

A pedestrian survey and intensive visual examination of the designated right-of-way was conducted. The proposed route was staked and clearly indicated. Approximately fifty per cent of the proposed right-of-way traversed ploughed surfaces in agriculturally disturbed areas and a visual inspection of those areas was considered adequate for assessing subsurface cultural remains. Subsurface testing, in the form of shovel holes (50 cm diameter), was carried out in areas of minimal exposures (i.e. forested areas).

The survey resulted in the identification of three historical resource sites. Sites EdPf 4, EdPg 21 and EdPg 22 are isolated finds. All of these sites will be subject to primary impact. No further study has been recommended. Photographic documentation, recording and artifact collection have mitigated impact.

Based on the results of this study, historical resources clearance was granted to NOVA, An Alberta Corporation by the Archaeological Survey of Alberta, Alberta Culture. Verbal clearance was sought at the request of the Client to facilitate an imminent construction schedule.

82-98	B.M. Newton ARESCO Ltd.	Shell Canada Resources Ltd., Gas gathering system, Gordondale

An extended archaeological survey of the proposed Progress Plant Site and Gas Gathering System was conducted by ARESCO Ltd.

Although the majority of the right-of-ways were traversed, intensive on-ground/pedestrian surface and subsurface inspection was also conducted along 50% of the routes and on the proposed plant site.

Four historical resource sites were recorded. Two of these sites will be impacted by the proposed development. However, neither site was judged significant and no further work has been recommended.

82-99	B.W. Wright ARESCO Ltd.	City of Red Deer, Waskasoo Park Red Deer

The archaeological impact assessment of Waskasoo Park in Red Deer succeeded in locating eight sites in addition to two previously recorded palaeontological sites. These consist of one palaeontological site, five prehistoric sites and two historic sites.

The majority of these sites are low in significance both in terms of further scientific investigation and on-site interpretation.

Two sites, an historic dump and a prehistoric lookout are recommended for further investigation though only the prehistoric site is of immediate concern. Further, it is recommended that the prehistoric use of the Red Deer River Valley be interpreted as a theme to the public in one or more modes.

82-100	B.M. Ronaghan Lifeways of Canada Ltd.	Alberta Power Ltd., Transmission line, Bonnyville

Lifeways of Canada Limited on behalf of Alberta Power Limited carried out an Historical Resources Impact Assessment of approximately 53 km of proposed transmission line right-of-way (Bonnyville-Ethel Lake-Ethel Junction transmission system). The system is located in north central Alberta between Bonnyville and Ethel Lake.

With the exception of several small areas, the entire alignment was examined. Areas which had been previously disturbed were subjected to visual examination only as were areas which were characterized by agricultural fields, a bulldozed township line or segments which abutted a relatively new right-of-way for an AEC pipeline. Judgemental shovel testing was utilized as a primary site detection method in undisturbed areas which exhibited any feature of archaeological interest.

No historic resource sites were recorded and no further historical resource studies are recommended for any portion of the right-of-way.

82-101	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	Amoco, Gas pipeline, Rocky Mt. House

No historical resource sites were identified in the course of an Historical Resources Impact Assessment of the proposed Amoco Canada Petroleum Company Ltd. South Ricinus Loop scheduled for development in west-central Alberta. Based on the results of this study it is recommended that Amoco Canada Petroleum Company Ltd. be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-102	J.W. Pollock Settlement Surveys Ltd.	Greg Meyer, Subdiv., Athabasca

An archaeological survey was conducted of a proposed subdivision near Island Lake northwest of the Town of Athabasca, Alberta.

Fieldwork consisted of a program of systematic subsurface testing (50 metre transects with tests every 50 metres) with particular emphasis on the surface and subsurface survey of the ravine rim.

As no historical resources sites were discovered on the property, it is recommended that the development be allowed to proceed without further regard to historical resources.

82-103	J.W. Pollock Settlement Surveys Ltd.	Transalta Utilities, Transmission line, Entwistle

An archaeological survey was conducted of the proposed Pembina River Crossing of the South Entwistle-Bickerdike 240 kV transmission line.

Systematic subsurface testing of the Pembina watercrossing was implemented with emphasis on testing the tops of the valley rims where sites are more likely to occur. Twenty subsurface test pits were made approximately every 2 to 3 metres within and to some distance on either side of the proposed R.O.W. Additional subsurface testing was done along a former Oxbow now separated from the river. In addition, ten test pits were placed near the present river banks and a surface examination made for paleontological materials.

As no historical resources sites were discovered on the R.O.W., it is recommended that the transmission line be allowed to proceed without further regard to historical resources.

82-104	S.J. Minni Historical Resources Consultant	Norcen Energy Resources, Gas pipeline, County of Lac St. Anne

At the request of W.E. Mitchell, Project Engineer for Norcen Energy Resources Ltd., an Historical Resources Impact Assessment was undertaken for a proposed gas pipeline right-of-way. The right-of-way (15 m wide by 40 km long) was located in the environs of Lac Ste. Anne and Majeau Lake in the county of Lac Ste. Anne.

The field survey located 8 prehistoric archaeological sites within the right-of-way. Five of the sites were surficially apparent in cultivated fields (FjPo 3, FjPp 36 and FlPo 3, 4 and 5), 1 site was surficially apparent as a result of non-project related bulldozer activity (FkPo 12) and 2 sites were buried in cultivated fields (FkPp 13 and 14).

All of the archaeological sites contained limited and/or generally unimpressive cultural remains with no temporally or culturally diagnostic artifacts or features recovered. All of the sites had been seriously impacted by past land disturbance activities.

The location, recording and assessment of the 8 historical resources sites located within the proposed gas pipeline right-of-way resulted in the conclusion that none of the archaeological sites would be of further value in the study of prehistoric culture. Although all of the sites will be directly impacted by pipeline construction it is the consultant's opinion that the recording and preliminary investigation of each site has mitigated the potential impact by the proposed development.

82-105	J.M. Calder Lifeways of Canada Ltd.	Jager Holdings Ltd., Industrial development Calgary

Lifeways of Canada Ltd. carried out an Historical Resources Impact Assessment of lands projected for development as part of a commerical retail area, office complex and hotel in southeast Calgary. The proposed development area is approximately 16 ha of which approximately 25% (4 ha) has been previously disturbed.

Field studies consisted of foot traverses of undisturbed lands at an interval of approximately 40 metres. Shovel tests were excavated on features of interest. Approximately 29 shovel tests were excavated.

No prehistoric sites were noted within the study area. No further work is recommended.

82-106	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	Nova, Pipeline & Meter station, Wainwright

An Historical Resources Impact Assessment of the proposed NOVA Rivercourse Natural Gas Pipeline and Meter Station, scheduled for development in east-central Alberta, resulted in the identification of no historical resource sites.

Based on the results of this study, it is recommended that NOVA be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-108	R.J Heitzmann Fedirchuk McCullough & Assoc. Ltd.	PanCanadian Petroleum, Gas Gathering System, Hussar

An Historical Resources Impact Assessment of the proposed PanCanadian Petroleum Limited Hussar - Crowfoot Gas Facilities scheduled for development in southern Alberta resulted in the identification of five historical resource sites.

Two sites (EgPf-13 and EgPf-14) are prehistoric campsite locations. The additional three sites (EfPf-8, EgPf-15 and EgPf-16) are isolated find locations. Each of these sites is located within the proposed right-of-way. Potential impact to these site locations was mitigated during the Historical Resources Impact Assessment. No further study is recommended.

Based on the results of this study, PanCanadian Petroleum Limited was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-109	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	Northwestern Utilities, Pipeline, Genessee/Keephills

An Historical Resources Impact Assessment of the proposed Northwestern Utilities Limited Genesee-Keephills Natural Gas Transmission Pipeline, scheduled for development in central Alberta has resulted in the identification of five historical resource sites.

All five are lithic scatters and four of these sites (FiPn-45, FiPn-150, FiPo-178, FiPo-179) are located within the major right-of-way. The fifth, FiPo-180, is located on the alternate route. Photographic documentation, recording and collection of the artifact have mitigated impact on that site. No further study has been recommended for FiPo-180. Avoidance or surface collection and testing has been recommended for FiPn-45, FiPn-150, FiPo-178 and FiPo-179.

Based on the results of the Historical Resources Impact Assessment, it is recommended that Northwestern Utilities Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture provided that the alternate route in 11-51-3 W5M be used and that the right-of-way in 1-51-3 W5M be moved a short distance to the southwest.

82-110	J.M. Hunt ARESCO Ltd.	DS Petroleum Consultants, Wellsite, Taber

In September 1982 ARESCO Ltd. was requested to inspect a drilling lease for historical resource sites. The lease is located northeast of Taber, Alberta. The drilling site overlooks a tributary of the Old Man River to the south and east.

Examination of the lease consisted of a surface inspection of the area and terrace margins. No shovel tests were dug since subsurface exposures were excellent in the disturbed areas.

Two partial tipi rings were noted within the southeast quadrant of the lease boundaries. This area was undisturbed and was about 20m from the terrace edge. One ring was recorded at the southeast corner of the lease and the second about 25m to the west. A quartzite core was also noted in the surface.

Another four rings were recorded east of the lease close to the terrace edge and included one complete ring and three partial arcs in an area $15m^2$. These features are located approximately 80m east of the northeast corner of the lease. No artifacts were noted on the surface.

The rings recorded are thought to represent a single site designated DlPa-10. The site has been partially disturbed as a result of drilling operations.

82-111	B.W. Wright ARESCO Ltd.	Canadian Superior Oil Ltd., Pipeline, Majorville

The 11.2km Majorville - Scandia gas pipeline was inspected in its entirety for historical resources. Three prehistoric sites were located along the route which follows a route which generally avoids knolls and and slough margins.

EcPc-3 is probably a destroyed campsite evidenced by a small lithic scatter of quartzite fire broken rock and debitage. No further work is recommended.

EcPd-2 is a possible tipi ring located in a low lying area between two knolls. No cultural material was observed but the site can be avoided by moving the right-of-way 5km to the south.

EcPd-3 is a well defined tipi ring lying 3m north of the right-of-way. It will not be impacted.

82-114	J.W. Pollock Settlement Surveys Ltd.	NOVA, Kehiwin Pipeline, Muriel Lake/Bonnyville

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on the proposed Kehiwin Pipeline.

The entire 25.5 km (18 m R.O.W.) was walked on foot utilizing a zig-zag or random wandering pattern with test pits every 100 metres in forest or pasture land and every 300 metres in cultivated land with good surface visibility. Areas of extra high potential were tested every 10 metres. When sites were encountered a minimum of five extra test pits were placed.

The survey resulted in the discovery of five prehistoric archaeological resources sites all consisting of isolated prehistoric findspots (GbOs-4 to 8) of limited scientific value. Testing at these sites showed them to be of limited value and no further work is recommended.

In addition to the prehistoric finds, two historic sites were located. One, a circa 1906 trading post and one, a former general store circa 1920, were recorded near the right-of-way.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the pipeline be cleared for historical resources concerns.

82-115	I.R. Wilson ARESCO Ltd.	Alberta Environment, Crawling Valley Project

An historical resource inventory was conducted in the fall of 1982 in the Crawling Valley, north of Bassano on behalf of Alberta Environment. The proposed project will involve flooding of about 4100 ha and will also include several ancillary facilities such as borrow areas, canals and dykes.

Following the inventory program, several sites were evaluated by a series of one meter test excavation units.

Inventory of the study area included all proposed developments. Procedures consisted of systematic traverses of the study area and included examination of exposures such as cut banks, trails and cattle wallows. Exploratory subsurface testing was not undertaken because of the excellent ground exposure in the study area, the majority of which is undisturbed native prairie.

Sixty-five new sites were inventoried and the one previously recorded site in the study area was re-examined. Of the 66 sites, 59 represent rock feature sites, either cairns, stone circles or a combination of the two.

Following inventory, 8 stone circle sites (5 single ring sites and 3 multiple ring sites) were test excavated. In all 55 one meter units were dug, 5 at each ring tested. Artifact recovery ranged from 0.5 artifacts/$1m^2$ at single ring sites to 2.5 artifacts/$1m^2$ at multiple ring sites. This is felt to be typical of ring site artifact return elsewhere in the province. No diagnostic artifacts were recovered, but residue analysis identified one woodworking tool and two artifacts used for butchering or hide work.

Mitigation is considered warranted in the form of mapping and excavation.

82-116	B.M. Newton Settlement Surveys Ltd.	NOVA, Pipeline, Wabasca

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. of two river crossings on NOVA's proposed Hoole Pipeline. Systematic subsurface testing failed to disclose any archaeological sites.

As no historical resources sites were discovered at the proposed crossings, it is recommended that the development be allowed to proceed without further regard to historical resources.

82-118	Jack Brink Archaeological Survey of Alberta	P.P. Development, Alberta Provincial Parks, Buck Lake

In September, 1982, the permit holder and one assistant completed a

Historical Resources Impact Assessment of the newly proposed Buck Lake Provincial Park on the northeast shore of Buck Lake, some 25 km south east of Drayton Valley. Field work consisted of a one day examination of areas not checked during the initial 1980 survey. Foot traverse and shovel testing were employed to complete the H.R.I.A.. No new sites were discovered. One historic site discovered during the initial 1980 survey was re-visited and photographed and tested. This site consisted of two log cabins and associated out buildings, apparently used by trappers during the 1940's. Two other small prehistoric sites situated on the lake shore were also recorded during the 1980 survey; these, however, were not re-visited in 1982.

In general, the historical resource inventory of the proposed Buck Lake park area is low, and construction of the park should pose little or no threat to historical resources.

82-119	R.J. Balcom ARESCO Ltd.	Canadian Western Natural Gas, Cayley - Fort Macleod Replacement Pipeline

In September, 1982 an Historical Resources Impact Assessment was conducted on selected portions of a pipeline replacement route from Cayley - Fort Macleod.

A total of 40.5 kilometers was covered on foot. The landscape was almost entirely cultivated.

Seven archaeological sites were recorded during the impact assessments. Five of these were isolated finds and the others were lithic scatters.

One of the isolated finds, EcPk-7, was located in a sparsely vegetated coulee bottom. Due to the potential for deeply buried cultural horizons, pipeline construction was monitored through the coulee. The results were negative.

Construction was allowed to proceed through the remainder of the sites due to their disturbed context and the paucity of cultural material.

82-120	D.N. Steer DS Consulting	NOVA, Pipeline, Lac La Biche

In September 1982 DS Consulting conducted an heritage resource survey and impact assessment for a gas pipeline right-of-way proposed by Nova in east-central Alberta.

Surface examination and subsurface test excavation along the proposed development revealed one historic heritage site. This site, DfPd 1 is an eurocanadian farmstead evidenced by a number of log and plank structural remains on the western bank of a small unnamed creek, a short distance from the development corridor. The site is beyond the bounds of the proposed right-of-way and as such, preliminary extant recording represents sufficient mitigation. No further archaeological work is recommended for the immediate pipeline project above that which has been completed to date.

82-121	D.N. Steer DS Consulting	Nova, Gas pipeline, Lacombe

In September 1982, DS Consulting conducted an heritage resource survey and impact assessment of a gas pipeline right-of-way for Nova in southwestern Alberta. Surface examination and subsurface test excavation along the proposed route evidenced no heritage sites.

No further archaeological work above that which has been completed to date is recommended for the immediate pipeline project.

82-123	R.J. Balcom ARESCO Ltd.	Luscar Ltd., Tofield Project

In the autumn of 1982 ARESCO Ltd. undertook an Historical Resources Impact Assessment on lands near Tofield to be disturbed by coal strip mining and associated infrastructures. Two sites were located during the study.

FePd-1 is an extensive lithic scatter on a parcel of land overlooking Beaverhill Lake. Systematic surface collection has been recommended as the appropriate mitigative measure for this site.

FiPd-2 is an historic site and is the physical remains of the Tofield Coal Company which began operations just after the turn of the century. It is recommended that the documents littering the abandoned office structure be collected and turned over to the Provincial Archives.

82-126	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Esso Minerals Canada Ltd., Coal Mine, Hinton

An Historical Resources Impact Assessment of the proposed Esso Minerals Canada Limited Test Pit Target Areas (Zone "A" and Zone "B") within the Hinton East Coal Properties resulted in the identification of one prehistoric site, FiQi-6, an isolated find. No further study of the site is recommended. Photographic documentation, recording, and collection of the artifact have mitigated impact. The ground reconnaissance indicates that development within Zone "A" and "B" will not impact historical resource sites.

A re-examination of Site FiQi-1 within the Hinton East Coal Properties indicates that it lies well outside the proposed development zones and will not be subject to primary impact.

Based on the results of this study it is recommended that Esso Minerals Canada Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture to proceed with the proposed testing program within Zone "A" and Zone "B".

82-127	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	Nova, Pipeline, Vermillion

An Historical Resources Impact Assessment of the proposed Nova Clandonald and Maughan, Natural Gas Pipelines and Meter Stations, scheduled for development in east-central Alberta resulted in the identification of no historical resource sites.

Based on the results of this study, it is recommended that NOVA be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-129	S.G. Van Dyke Lifeways of Canada Ltd.	CEP Consultants, City of Calgary Research, Calgary

Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of lands projected for development in conjunction with the establishment of a research park in the Crowchild Sector of Northwest Calgary. The study was carried out on behalf of CEP Consultants Ltd., planners for the Calgary Research and Development Authority.

Archaeological studies were carried out in two stages. The first stage consisted of a literature and file search, and foot traverses of the study area designed to identify surficial sites. The second stage of archaeological studies consisted of an H.R.I.A. level subsurface prospection of sensitive areas and known sites. This involved shovel testing, backhoe testing and re-examination of known sites.

Two of the identified prehistoric sites, EgPn-293 and EgPn-295, were originally assessed as representing a single stone circle and a clustering of stone circles, respectively. The third prehistoric site, EgPn-294, was assessed as a clustering of prehistoric cairn-like features.

A moderate number of shovel tests and 14 backhoe tests failed to yield cultural material. Re-examination of EgPn-293 and EgPn-295 failed to reveal meaningful patterns of stone distribution. Shovel testing revealed that till was located close to the surface. As such the ambiguous distribution of stone features could simply represent large cobbles, associated with the till, which naturally protrude through to the surface.

82-130	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	I.D. Engineering Urban Park, Lloydminster

One historical resource site was identified within the proposed City of Lloydminster Urban Park Development Zone. Site FhOm-2 is a small surface lithic scatter and will be subject to primary impact. No further study has been recommended. Photographic documentation, recording and collection of the artifacts have mitigated impact.

Based on the results of this study, it is recommended that the City of Lloydminster and I.D. Engineering Company Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-133	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	NOVA, Gas pipeline, Camrose

An Historical Resources Impact Assessment of the proposed NOVA Ohaton Lateral Natural Gas Pipeline and Meter Station, scheduled for development in east-central Alberta has resulted in the identification of two historical resource sites.

FfPd-2 is an isolated find and will probably be subject to secondary impact. No further study has been recommended. Photographic documentation, recording and collection of the artifact have mitigated impact.

FfPe-5, a previously recorded site, is a surface scatter or campsite consisting primarily of fragments of fire broken rock and very few other artifacts. Previous test excavations indicated that artifact density was extremely low and diagnostic materials were absent. Additional shovel tests confirmed this interpretation. No further study has been recommended. Previous and current photographic documentation, recording and test excavations have mitigated impact. No further studies at FfPe-5 or FfPd-1 have been recommended.

82-138	S.G. Saylor Ethos Consultants Ltd.	Rand Development, Wellsite, Medicine Hat

Ethos Consultants Ltd. was contracted in October, 1982 concerning the possible presence of significant historical resources within a proposed Rand Development Ltd. gas wellsite located approximately six miles north of Medicine Hat. Archaeological site EaOp-3 was previously recorded in the same quarter-section as the wellhead was to be located. Wellhead examination consisted of surface inspection as well as subsurface shovel testing. Neither EaOp-3 nor additional cultural materials were located during the investigation, and development was recommended to proceed.

82-139	S.G. Van Dyke Lifeways of Canada Ltd.	City of Calgary, Park Development, Calgary

Lifeways of Canada Limited carried out an Historical Resources Impact Assessment of lands proposed for development in conjunction with the creation of a park in southeast Calgary. The study was carried out on behalf of Lombard North Group Ltd.

Archaeological studies were carried out on October 19th and October 20th, 1982. Archaeological studies included a visual examination of the study area, shovel testing in areas of archaeological potential and a backhoe testing program in areas characterized by relatively deep surficial sediments (i.e., greater than 80 cm).

It was reported that three prehistoric sites were present within the study area (Rogers 1971, Reeves 1978b). These sites, EfPm-45, EfPm-46 and EfPm-111, were re-assessed. All of these sites were found to be located outside of the property. Two sites were identified within the study area; one, EfPm-142, consisted of a surficial observed artifact and one bone fragment at depth. It is of little concern. The other site, EfPm-143, is an extensive zone of prehistoric occupation characterized by multiple components, horizontally and vertically stratified. The site area is confined to a wedge shaped terrace at the south end of the study area.

Based on the observed condition of the site, its size, the depth of burial, its contents, and a potential for stratigraphy, EfPm-143 is considered to be of value and significance. It is recommended that prior to the development of the park and gravel mining operations, impacts to the site should be mitigated by archaeological excavations.

82-141	S.D. Haley Fedirchuk McCullough & Assoc. Ltd.	Nova, Pipeline/ transmission line, County of Stettler

An Historical Resources Impact Assessment of three arms of a proposed NOVA natural gas transmission pipeline system scheduled for development in central Alberta resulted in the identification of nine historical resource sites.

Scollard Lateral Natural Gas Pipeline. Six historical resource sites were identified near or within the proposed Scollard Lateral Natural Gas Pipeline right-of-way. Site ElPb-2 is an artifact scatter and will be subject to primary impact. No further study has been recommended.

Sites ElPc-4 and EdPd-10, an artifact scatter and a stone circle site respectively, will also be subject to primary impact. Alteration of the right-of-way way to avoid impacting those sites or appropriate mitigative measures have been recommended.

The remaining sites are situated outside the proposed development zone and will not be subject to primary impact. No further studies have been recommended if construction activities are confined to the proposed right-of-way.

Rumsey Lateral Natural Gas Pipeline. Two historical resource sites were located within the Rumsey Lateral Natural Gas Pipeline right-of-way. Both ElPe-18, an isolated find, and ElPe-19, an artifact scatter, will be subject to primary impact. No further study has been recommended at either site.

Big Valley Lateral Natural Gas Pipeline. One historical resource site was identified within the Big Valley Lateral Natural Gas Pipeline right-of-way. ElPe-17, a stone circle site, will be subject to primary impact. It has been recommended that the proposed right-of-way be moved to the east or west to avoid the site. Otherwise, a limited testing programme is recommended.

Based on the results of the Historical Resources Impact Assessment of the Scollard, Rumsey and Big Valley Natural Gas Pipeline rights-of-way and providing that mitigative measures be undertaken at Sites ElPc-4, ElPd-10 and ElPe-17, it is recommended that NOVA be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-144	J.W. Pollock Settlement Survey Ltd.	Transalta Utilities, Transmission line, Ft. Saskatchewan

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on an 8 km, 240 kV electric transmission line from Lamoureous to the centre of Section 3-55-21-W4M. The survey resulted in the discovery of seven new archaeological resources sites consisting of one isolated prehistoric findspot (FkPg-73) of limited scientific value and six prehistoric campsites (FkPg-72, 74, 75, 76, 77, 78). Testing of these sites showed them to be of limited value and no further work is recommended at any of the above sites.

In addition to the new prehistoric finds, a previously recorded prehistoric site (FkPh-16) was located on the right-of-way and a site update completed.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the portion of the line inspected be cleared for historical resources concerns.

82-145	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	Biewag Energy Resources, Industrial Subdiv., Waskatenau

An Historical Resources Impact Assessment of the proposed Biewag Methanol Plant Site scheduled for development in central Alberta, resulted in the identification of one historical resource site. This is the location of an early farmstead, probably constructed between 1910 and 1920. It is, however, of low historical significance due to the poor condition of these buildings.

Based on the results of this study, it is recommended that Western Research Division, Bow Valley Resource Services Ltd. be granted historical clearance.

82-146	R.J. Balcom ARESCO Ltd.	Canadian Western Natural Gas, Lethbridge - Taber

In November, 1982 an historical resources field reconnaissance was conducted on lands to be disturbed by construction of the Lethbridge - Taber pipeline replacement. The route had not been finalized at this time.

Archaeological field procedures involved foot traverses only. Nine archaeological sites were recorded at this time. Some of these sites are considered to be of sufficiently significant value to warrant further investigations.

It is recommended that once the route is finalized, any areas removed from those examined in November be studied. The consultant also feels that shovel testing is necessary in some undisturbed areas such as the coulee/creek crossings. These recommendations are not necessarily consistent with those of the Archaeological Survey of Alberta however.

82-147	B.M. Newton Historical Resources Consultant	Transportation, Highway Upgrading, Dewberry

An Historical Resources Impact Assessment was conducted by the author on a portion of S.R. 893 slated for upgrading on the south side of the North Saskatchewan River, north of the Town of Dewberry.

A program of systematic subsurface testing augmented by surface survey of available exposures was employed in assessing the study area.

No historical resources sites were encountered during the course of the survey, and no further work is recommended prior to development.

82-148	D.N. Steer DS Consulting	Nova, Pipeline, Westlock

In November 1982, DS Consulting conducted an heritage resource site survey and assessment of a gas pipeline right-of-way for Nova in north-central Alberta. Surface examination and test excavation along the proposed route located three heritage sites. The sites, GaPj-4, GaPj-5 and GaPi-2, were of prehistoric origin and included a small prehistoric campsite, a limited activity locus and an isolated find. All sites were located off the established right-of-way. The sites were deemed to be of low to moderate archaeological potential and no further archaeological work was recommended for the immediate pipeline project above that which had been completed to date.

82-151	R.J. Heitzmann Fedirchuk McCullough & Assoc. Ltd.	Colt Engineering, Gas pipeline, Vulcan

An Historical Resources Impact Assessment of the proposed Westcoast Petroleum Ltd. pipelines and associated plant site scheduled for development in southern Alberta resulted in the identification of six historical resource sites.

Two sites (EcPf-2 and EcPf-3) are stone circle sites, two sites (EcPf-1 and EcPe-6) are cairns, one site (EcPf-5) is a stone drive line and one site (EcPf-4) is a historic farm building depression. Of these, only two sites, EcPf-4 and EcPf-5, are subject to primary impact. No further study has been recommended. Photographic documentation and recording have mitigated impact.

Based on the results of this study, it is recommended that Westcoast Petroleum Ltd. be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

82-152	J.W. Pollock Settlement Surveys Ltd.	NOVA, Pipeline, R.O.W., Keg River

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on the proposed Sloat Creek right-of-way.

Fieldwork consisted of the placement of numerous test pits and extensive surface inspection. The survey resulted in the discovery of a single archaeological resource site consisting of a prehistoric campsite (HiQq-1). Testing at this site showed it also to be of limited value and no further work is recommended.

In addition to the prehistoric find, an abandoned trapper's cabin was located at the Chinchaga River crossing and is fully described in this report.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the right-of-way be cleared for historical resources concerns.

82-153	J.W. Pollock Settlement Surveys Ltd.	Nova, Pipeline, Rich Lake

An Historical Resources Impact Assessment was conducted by Settlement Surveys Ltd. on the right-of-way for NOVA's proposed Helina Pipeline in the Rich Lake area of Alberta. The field inspection resulted in the discovery of three archaeological resources sites consisting of three prehistoric campsites (GdOv-4, 5 and 6). Testing at these sites showed them to be of limited value.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the proposed pipeline be cleared for historical resources concerns.

82-157	Norman Catto University of Alberta	Geologic Investigation of the Head-Smashed-In Buffalo Jump, Archaeological Survey of Alberta

Investigations are currently underway to define the geological deposits and Quaternary history of the area surrounding the Head-Smashed-In Buffalo Jump site. The field investigations and airphoto reconnaissance for the area have been completed. The buffalo jump is 10 km west of Fort Macleod at the southern margin of the Porcupine Hills. The jump site is an outcrop of Porcupine Hills Formation sandstone, that displays prominent joints and fractures. The area surrounding the jump site is covered by a thin blanket of loess. Discontinuous patches of till are exposed beneath the loess and overlying the bedrock along the Oldman River. The entire jump area has been glaciated but the exact time of glaciation is yet to be determined. The development of the escarpment was most likely initiated during the early Holocene.

82-158	Thomas H. Head University of Calgary	Research, EhPm-34 Calgary

Under a research grant supplied by the Archaeological Survey of Alberta, an evaluative program involving augering and a 9 square meter excavation was undertaken on the northern portion of this site. This work provided additional information for a Master's thesis and documentation for a designation package.

After gridding and surveying the site, 28 systematically located auger holes were dug. All contained considerable quantities of cultural materials; bone in all, firebroken rock in 24 and lithics in 19. Ceramics were recovered from one test as was a Late Prehistoric point from another.

Based on the quantity and diversity of material in surrounding tests, the nature of the soils and existing disturbance, an area was selected for the main excavation. The upper 50 cms. of pointbar deposits contained separate Old Women's, Avonlea and Pelican Lake horizons. Between 50 and 120 cms, a number of discrete depositional events (natural and cultural) were noted but diagnostics were not encountered. An additional 40 cms of sterile silts are present beneath the lowest cultural horizon. The excavations were terminated when the water table was encountered.

While the results of this program are not directly comparable to those from the southern portion of the site, they are certainly complimentary. The site clearly warrants consideration for designation.

CONTINUED RESEARCH ON GEOLOGICAL SOURCES OF BEAVER RIVER SANDSTONE

John W. Ives
Archaeological Survey of Alberta

Mark Fenton
Alberta Geological Survey
Alberta Research Council[1]

During a brief field period in July of 1982, Ives and Fenton conducted further investigations on the problem of geological sources for Beaver River Sandstone (Fenton and Ives 1982). This research is intended to delimit the range of natural occurrences of the raw material in order that the role of cultural activities in its dispersal may be determined. Beaver River Quarry (HgOv-29) was re-examined this year, while the search for other sources was extended to portions of the Athabasca, Muskeg, MacKay and Firebag Rivers.

At Beaver River Quarry, small trench excavations below the Beaver River Sandstone unit were undertaken at two points along the south face of the borrow pit (Figure 3, 4). These excavations revealed a series of laminated bituminous sands underlying the Beaver River Sandstone. Included in the bituminous sands are discontinuous lenses of very light-coloured sands which have little if any bitumen content. There can be little doubt at this stage of research that the Beaver River Sandstone unit as it exists at Beaver River Quarry has not been glacially transported. The field party also examined the entire perimeter of the borrow pit. This revealed discontinuities in the Beaver River Sandstone. These may result

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1. Alberta Geological Survey, Alberta Research Council, 4445 Calgary Trail South, Edmonton, Alberta, T6H 5R7.
Alberta Research Council Contribution No. 1182.

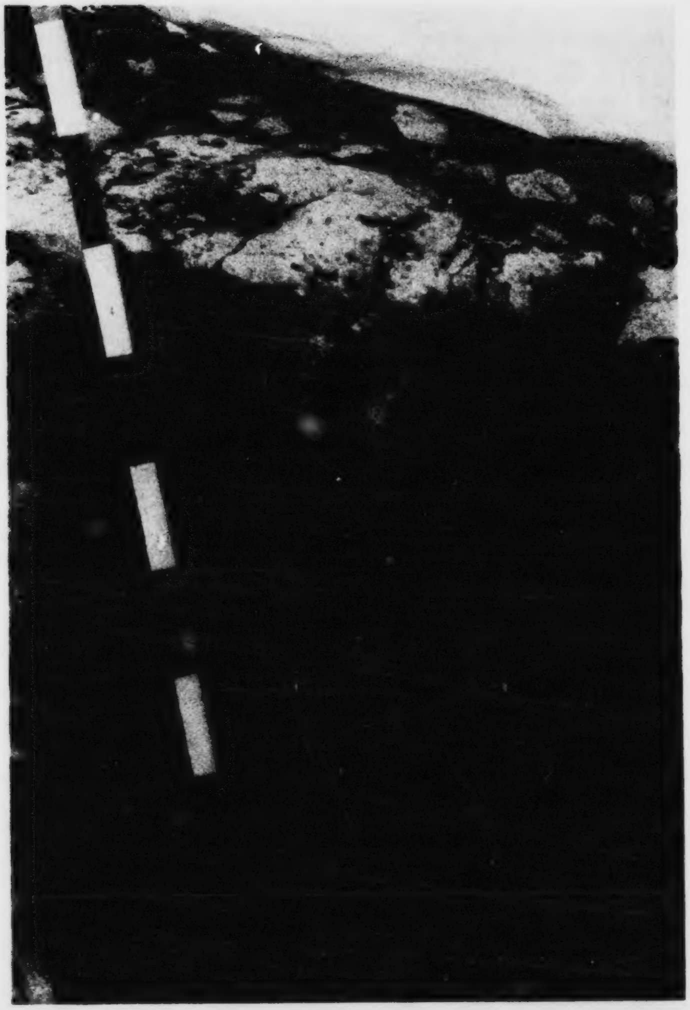

Figure 3: Beaver River Sandstone unit in place at the ground surface at the Beaver River Quarry borrow pit. Bituminous sands underlie the unit. Scale is divided into decimetres.

Figure 4: Profile of a stepped excavation immediately below that of Figure 3. Note white sand underlain by bituminous sands.

either from natural causes or the excavation of the borrow pit itself. Samples were taken from the east side of the borrow pit at a location where gradational change from oil sands to siliceous sandstone occurs over less than 30 cm of vertical distance. The 10-15 cm thick siliceous sandstone at this location appears to fill the base of a small channel 6-8 m in width. Thin sections from samples at this location have been prepared for analysis and will be important to an understanding of how Beaver River Sandstone was formed. For the present, it would appear reasonable to assume that Beaver River Sandstone was probably formed when unconsolidated sediments within bituminous sands, but lacking bitumen themselves, were subsequently silicified. No appreciably finer quality Beaver River Sandstone outcrops (for stone tool manufacture) were found at this site.

The final phase of investigation at Beaver River Quarry involved a traverse of the left bank of the Beaver River from Beaver River Quarry to a point a few hundred metres downstream. We were unable to observe Beaver River Sandstone outcropping along this embankment, save for a single, moderate-sized boulder on the embankment relatively near to the site. We would therefore suggest that Beaver River Sandstone was being procured at or near the surface of this site, but not from the embankment.

Early in July, Fenton and Ives proceeded upstream along the lower reaches of the Muskeg River, but did not penetrate beyond a point where glacial deposits overlaid Devonian bedrock. A spectacular collapsed Karst feature was noted, and this contained bituminous sands. Hardie supervised a portion of the field crew during an examination of the left bank of the MacKay River. This survey ended at a point 7 km upstream, again with negative results. As part of an Alberta Research Council project later in July (after the HhOv-55 discovery noted below), Fenton had the opportunity to observe sections along the central third of the Firebag River. No Beaver River Sandstone outcrops were observed, nor were any clasts of this material observed in the river gravels. Consequently, no additional Beaver River Sandstone sources were discovered in this phase of fieldwork.

The remainder of our activities focussed on the Athabasca River. Sections on both banks (but mainly the right bank) were examined by boat between Fort MacKay and a point just south of the Suncor plant near Tar Island. No Beaver River Sandstone outcrops were observed, although we were primarily examining sediments near the Devonian-Mesozoic contacts. We may have overlooked beds of Beaver River Sandstone within the main part of the McMurray Formation (see below). The ferrigunous sandstone Carrigy (1966) refers to in his "pre-McMurray?" unit was observed at the water level on the left bank of a major embankment immediately south of the Suncor plant. This material was coarse-grained and goethite-cemented. It is readily distinguished from Beaver River Sandstone.

The final episode of field activity took place in the vicinity of HhOv-55, at a point just south of the Oxbow at Cree Burn Lake (HhOv-16). Embankments along this portion of the right bank were accessed by foot from the former Shell barge landing. At HhOv-55, near the top of the highest portion of the section we discovered an in situ unit of Beaver River Sandstone (Figure 5, 6). Bituminous sands both underlie and overlie the unit. The unit is clearly within the McMurray Formation, and is likely within the Middle McMurray. Just prior to this discovery, a similar unit was noted in a slightly disturbed context 300 m to the south of HhOv-55. At this location, blocks of Beaver River Sandstone were discovered in sediments which had slumped forward a few metres. Only brief observation was possible because of the presence of a bees' nest. Both occurrences of Beaver River Sandstone are of perhaps slightly better quality for stone tool manufacture than is the case at Beaver River Quarry. None the less, no very fine-grained, high quality Beaver River Sandstone was found.

Remarks

In our earlier research, five solutions were proposed for the problem posed by the geological origin of Beaver River Sandstone. Based upon the present fieldwork, several revisions and elaborations are now possible. First, the stratigraphic position of the HhOv-55 outcrop is certainly well within the McMurray Formation. Consequently, Beaver River Sandstone may

Figure 5: An exposure of Beaver River Sandstone runs across the centre of the photograph, at HhOv-55. Note bituminous sands above and below the unit.

Figure 6: Closer view of the Beaver River Sandstone unit at HhOv-55. The unit is 10-20 centimetres thick.

be available in both "Pre-McMurray?" and McMurray Formation contexts. It may still also be argued that Beaver River Sandstone occurs only within the McMurray Formation. McPherson's and Kathol's (1977:Figures 5 and 10) structure contour maps for both the Devonian and McMurray Formation surfaces show that the Beaver River Quarry and HhOv-55 occurrences are at similar elevations (given the level of accuracy of the contouring). In other words, the bituminous sands underlying the Beaver River Sandstone at Beaver River Quarry could be McMurray in age. One explanation for this situation would be that of in place deposition on the Devonian surface of McMurray sediments including a Beaver River Sandstone unit. An alternate explanation, would involve Karst collapse to the present stratigraphic position of McMurray sediments, again including Beaver River Sandstone. Each of the three alternatives require further research.

Second, we previously adopted a conservative position regarding the regional significance of Beaver River Quarry because there had been no assessment of natural raw material variability at this site.* Based upon samples drawn from the perimeter of the rather extensive borrow pit, we conclude that it is most unlikely that Beaver River Quarry was the source of significant quantities of high quality material for stone tools.

Third, additional sources of Beaver River Sandstone were anticipated, and the HhOv-55 outcrop bears out such a prediction. Although there are no doubt several modern sources for Beaver River Sandstone, our current impression is that Beaver River Sandstone may have outcropped relatively rarely because the unit itself is not common. This last observation is supported by a number of geologists who have studied the outcrops and cores from the McMurray Formation and have not seen Beaver River Sandstone during their examinations. The source (or sources) of high quality Beaver River Sandstone, which so predominates in oil sands area artifact collections, has yet to be discovered. As others have indicated, we too would suspect such a source in close proximity to Cree Burn Lake (HhOv-16). This site has enormous quantities of Beaver River Sandstone artifacts made of high quality stone. There are some indications of a workshop context. Given this suspicion and the current state of research, we would hasten to add that other logical possibilities have not been precluded. For instance, it remains possible that the higher quality material was obtained only by "sorting" through large amounts of the coarse raw material at several different sources.

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*There is a substantial range of variability for Beaver River Quarry artifacts themselves; this may or may not have derived from the nature of the raw material source itself.

The remainder of our earlier propositions focused on the distribution of Beaver River Sandstone sources and artifacts. We would still expect a source configuration which would be diffuse, with a tendency towards linear exposure by water courses. The most obvious revision here is an expansion of the target zone for potential sources. Figure 7 shows the broader distribution of McMurray Formation exposures in the Athabasca River valley. It is apparent that potential sources would still seem largely confined to the Athabasca River valley.* The motivation for this research is in part founded upon the belief that study of geographical variations in Beaver River Sandstone use will reveal something of the scale of land use and direction of seasonal movements in prehistory. In turn, such information could be used to test hypotheses concerning fundamentally different forms of socio-economic organization. While this line of research holds great promise for a problematic archaeological record, documentation of Beaver River Sandstone sources is a fundamental prerequisite to this type of inquiry. To advance toward this objective, the target zone must be examined for alternate sources.

*Firebag River exposures may largely be ruled out based upon Fenton's observations. There could be one possible exception in that we have a first hand account of bituminous sands exposures on the northeast slope of the Birch Mountains. The McMurray Formation is relatively close to the surface at this point. It could conceivably be exposed by the McIvor River or Buckton Creek. Reconnaissance is needed in this area. Furthermore, if Beaver River Sandstone outcrops are as rare as they seem to be in the Athabasca River valley, the chances do seem diminished for sources in restricted exposures on the northeast slope of the Birch Mountains.

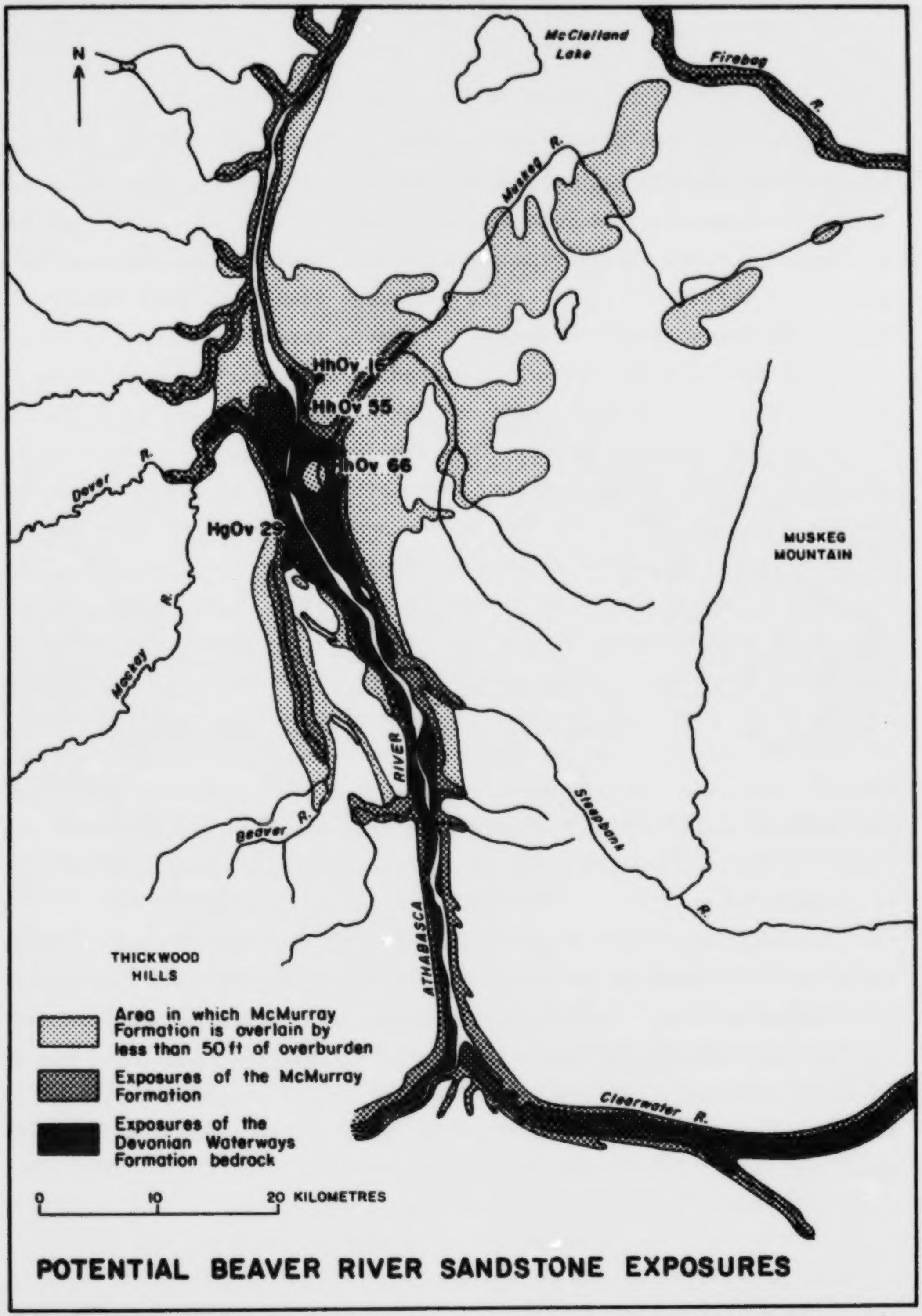

N
McClelland Lake
Firebag R.
Muskeg R.
HhOv 16
HhOv 55
HhOv 66
HgOv 29
Dover R.
MUSKEG MOUNTAIN
Mackay R.
RIVER
Steepbank R.
Beaver R.
ATHABASCA
THICKWOOD HILLS
Clearwater R.
Area in which McMurray Formation is overlain by less than 50 ft of overburden
Exposures of the McMurray Formation
Exposures of the Devonian Waterways Formation bedrock
0
10
20 KILOMETRES
POTENTIAL BEAVER RIVER SANDSTONE EXPOSURES

Figure 7: Distribution of Devonian and McMurray Formation exposures in the Athabasca River valley [after McPherson's and Kathol's (1977) Devonian and McMurray Formation (their Figures 5 and 10) and overburden (their Figure 11) contour maps].

In this regard, Wilson and McCullough (Anonymous 1982:65, 218) suggest several hypothetical means by which Beaver River Sandstone may have been naturally dispersed from source areas. We offer the rejoinder that such dispersion must be empirically demonstrated. Both Fenton and Ives have observed a variety of tills in the oil sands area since this research began, and Beaver River Sandstone is notably absent. To recapitulate, till sections have been closely examined in the central Birch Mountains depression, on the Alsands Lease, on the Firebag River and at different points on the Athabasca River. This examination also included a large gravel pit on the Syncrude lease, immediately south of Beaver River Quarry (Fenton and Ives 1982). In fact we are presently aware of only two boulders of Beaver River Sandstone apparently separated from their sources. These are still in close proximity to HhOv-55 and Beaver River Quarry, respectively. We are not aware of any field evidence to support the notion of a "dispersal envelope". While attention must be devoted to the problem of natural dispersion from sources, evidence of this dispersal will have to be provided before it can be considered more than hypothetical. There is already important negative evidence regarding glacial or fluvial dispersal. This must be coupled with the knowledge that Beaver River Sandstone seems rare, and that vegetative cover in the boreal forest would greatly obscure till occurrences.

We would also caution that even perfect knowledge of modern sources would still not provide absolute information about the configuration of prehistoric sources. There are, therefore, both practical and temporal limits which may be applied to the search for existing sources. For the moment, our highest research priority will be the systematic search for sources within the target zone, particularly for those of high quality material.

INTERIM REPORT OF THE 1982 UNIVERSITY OF CALGARY ARCHAEOLOGY FIELD SCHOOL AT THE STRATHCONA SITE (FjPi-29), ALBERTA

Permit 82 - 14c

James W. Helmer
University of Calgary

INTRODUCTION

From May 14 to September 7, 1982, members of the Department of Archaeology at the University of Calgary conducted archaeological excavations at the Strathcona Site (FjPi-29) as part of a continuing archaeological field school/public education programme. Financial and administrative support for this project is being provided by the Archaeological Survey of Alberta, the Department of Archaeology at the University of Calgary and the Faculty of Continuing Education at the University of Calgary. This interim report outlines the long range research objectives set in place during the 1982 season and summarizes briefly the preliminary results obtained to date.

BACKGROUND

The Strathcona Site (FjPi-29) is located on the east bank of the North Saskatchewan River within the borders of the City of Edmonton's Strathcona Science Park (Figure 8). Initially discovered in 1976, a series of preliminary excavations were undertaken at FjPi-29 during the summer of 1978 to assess the impact that the development of the proposed science park would have on the site (Newton and Pollock 1979). In 1979 the decision was made to incorporate the Strathcona Site as an interpretive component of the Strathcona Science Park. A programme of mitigative excavation was subsequently undertaken in the fall of that year in areas slated for disturbance (Ives 1980). This work continued at FjPi-29 during the summer of 1980 (Pyszczyk 1981). This latter season marked the inaugural year for the Strathcona Site as a public interpretive facility.

In 1981 the Department of Archaeology at the University of Calgary, under contract to the Archaeological Survey of Alberta, initiated an archaeological field school at the Strathcona Site (Driver, Haley and Kooyman 1982).

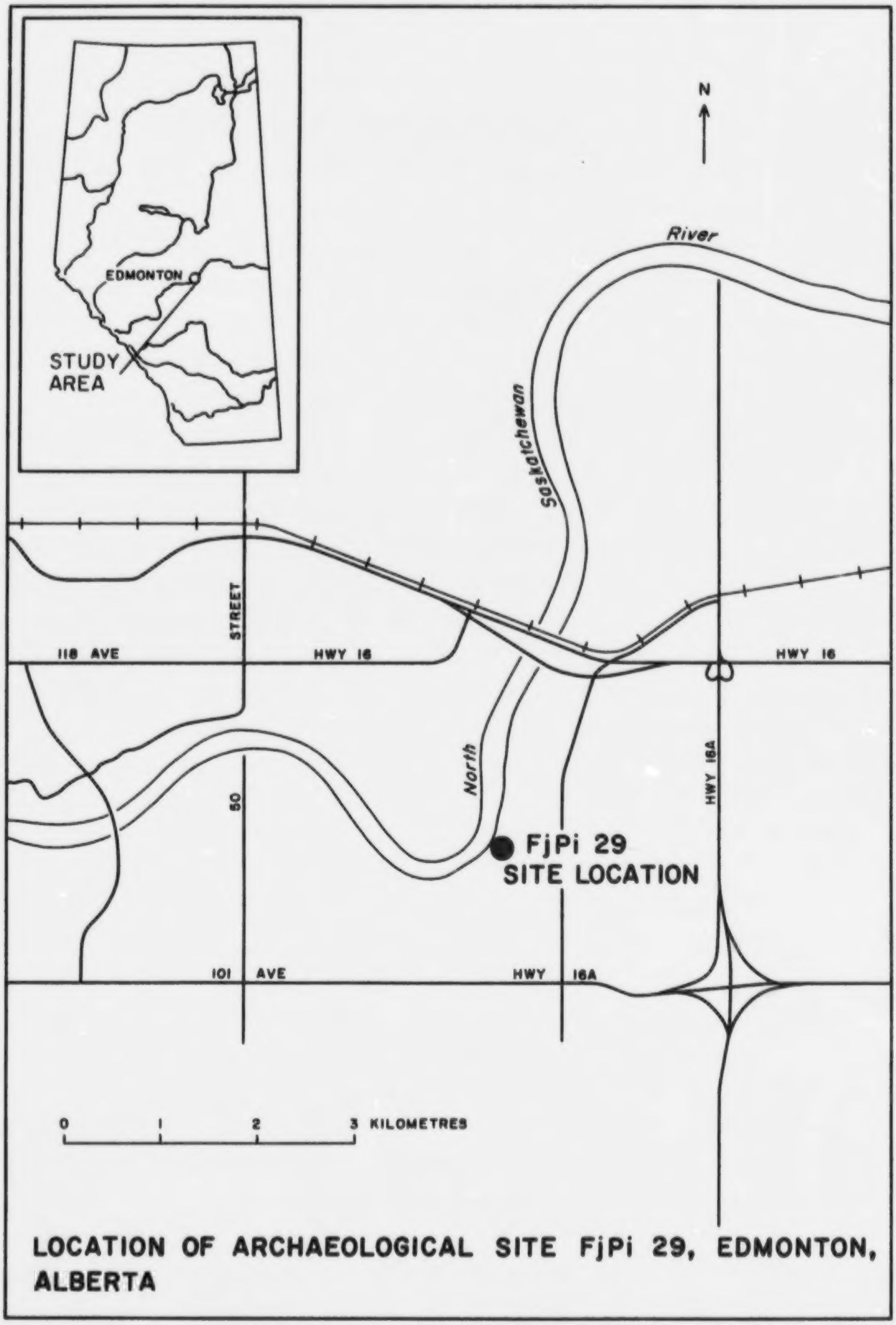

STUDY AREA
EDMONTON
N
River
Saskatchewan
North
118 AVE
STREET
HWY 16
HWY 16
50
HWY 16A
FjPi 29 SITE LOCATION
101 AVE
HWY 16A
0
1
2
3 KILOMETRES
LOCATION OF ARCHAEOLOGICAL SITE FjPi 29, EDMONTON, ALBERTA

Figure 8: Location of the Strathcona Science Park Site.

The purpose of this field school was to offer university students credit courses in applied archaeological field techniques, to allow the general public to view professional archaeologists at work on a prehistoric site and to initiate a long term, problem-oriented research design at FjPi-29.

During this past season the University of Calgary continued its field school programme at the Strathcona Site with two credit courses in archaeological field techniques offered during each of the Spring and Summer Sessions. In addition, volunteers from the public were given the opportunity to participate in excavation at the site. Over 200 people applied for the limited number of available positions. Over the three and a half month field season twenty-six volunteers, selected on a first-come, first-serve basis, joined the field school students at work on the site.

The excavations carried out over the last four years have succeeded in identifying the major characteristics of the archaeological record at FjPi-29. The analysis of recovered projectile points, supported by several radiocarbon dates, has revealed that the Strathcona Site contains multiple occupations representing both the Middle Prehistoric (Oxbow, Hanna, Duncan, McKean and Pelican Lake Phases) and the Late Prehistoric (Besant, Old Woman's Phases) periods. An occupation spanning approximately 5000 years of Northern Plains prehistory has thus been inferred (Newton and Pollock 1979, Ives 1980, Pyszczyk1981, Driver, Haley and Kooyman 1982). Several detailed studies of the lithic debitage from FjPi-29 have also suggested that the Strathcona Site functioned primarily as a lithic workshop where prehistoric peoples - taking advantage of a ready supply of quartzite, chert and petrified wood cobbles to be found on the exposed stratum of Saskatchewan Sands and Gravels in nearby Pine Creek - came on a seasonal basis to extract lithic raw materials and to produce transportable tool preforms and finished implements. That FjPi-29 also functioned as a habitation site during its tenure as a lithic reduction area has been made clear as well (Ives 1980, Pyszczyk 1981 and Driver, Haley and Kooyman 1982).

Past research at the Strathcona Site has also revealed that the portion of the site contained within the fenced compound (ca. 10,000 m^2) represents only a fraction of its original extent (Pyszczyk 1981). Much of the site was destroyed by past landfill operations and recent construction relating to the development of the Science Park itself contributed to some disturbance. Previous researchers also noted that while undoubtedly multicomponent, cultural stratification of deposits at FjPi-29 is not clear in all areas of the site. Furthermore, several investigators have also suggested that there has been some natural cultural disturbance of the soil matrix contributing to the apparent mixture of assemblages (Ives 1980; Pyszczyk 1981; Driver, Haley and Kooyman 1982).

RESEARCH OBJECTIVES

Excavations at the Strathcona Site to date have been oriented primarily towards site-specific research goals. That is to say the documentation of cultural components, the search for natural and/or cultural stratigraphy, the analysis of disturbance agents, etc., have been the major concerns. In addition, Ives (1980) and Pyszczyk (1981) have attempted to assess the position of FjPi-29, and other sites of its kind, within a regional subsistence-settlement context. Only a small fraction of the total extant area of the site has actually been examined and those areas which have been investigated, for the most part, have been selected on the basis of non-random mitigative criteria. Much of the Strathcona Site, therefore, has never been tested and the site as a whole cannot be considered to have been truly representatively sampled.

For the 1982 field season a long term research design was set in place, for the principal intent of which is to structure and provide direction to the scope of investigations at the Strathcona Site. The primary objectives of this research design are:

1. To continue the intra-site analysis of FjPi-29 through the implementation of a probabilistic research strategy aimed at obtaining a representative sample of data relating to the horizontal and vertical distribution of cultural materials over the entire site and,
2. To study the broader regional context of the Strathcona Site through a structured, probabilistic site survey programme of a selected area of the North Saskatchewan River Valley

directed at determining the locational, functional and contextual parameters of various site types in the study area.

METHODS

Excavations

To implement the intra-site investigation of FjPi-29 a multistage cluster sampling design (Mueller 1979:36-38) was created to randomly distribute excavation units across the site and at the same time provide an analytical hierarchy of comparative spatial units. This sampling technique involved dividing the extant area of FjPi-29 into nine 40x40 m "areas". Each of these areas was then sub-divided into sixteen 10x10 "blocks". Using a sample computer programme (run on a Commodore 8032 micro computer) four of these blocks (=25% sample) were randomly selected from each of the nine larger units. These 10x10 m blocks were then each sub-divided into one hundred 1x1 "units". Five such units (=5% sample) were subsequently selected for excavation using the random number programme previously mentioned. Figure 9 depicts the distribution of the 40x40 m areas and the 10x10 m blocks so chosen. The 1x1 m units excavated during the 1982 season are also included in this figure.

Each 1x1 m unit was excavated in arbitrary 5 cm levels. A departure from this procedure was made when natural stratigraphic breaks (such as the distinct interface between the Bt horizon and the C horizon) were encountered. Such breaks were treated as natural levels.

All back dirt was screened through ca 6 mm mesh screens. All cultural material was recorded using three dimensional provenience. Detailed level plans and photographic records were maintained for all stages of excavation.

From each 5 cm level a 25 cm^2 soil sample was retained. These samples were coarse screened separately and bagged for future laboratory analysis of micro debitage counts following Fladmark (n.d.) and Burton (n.d.).

Survey

Previous researchers at FjPi-29 have suggested that the Strathcona Site was strategically located to extract raw materials from the band of

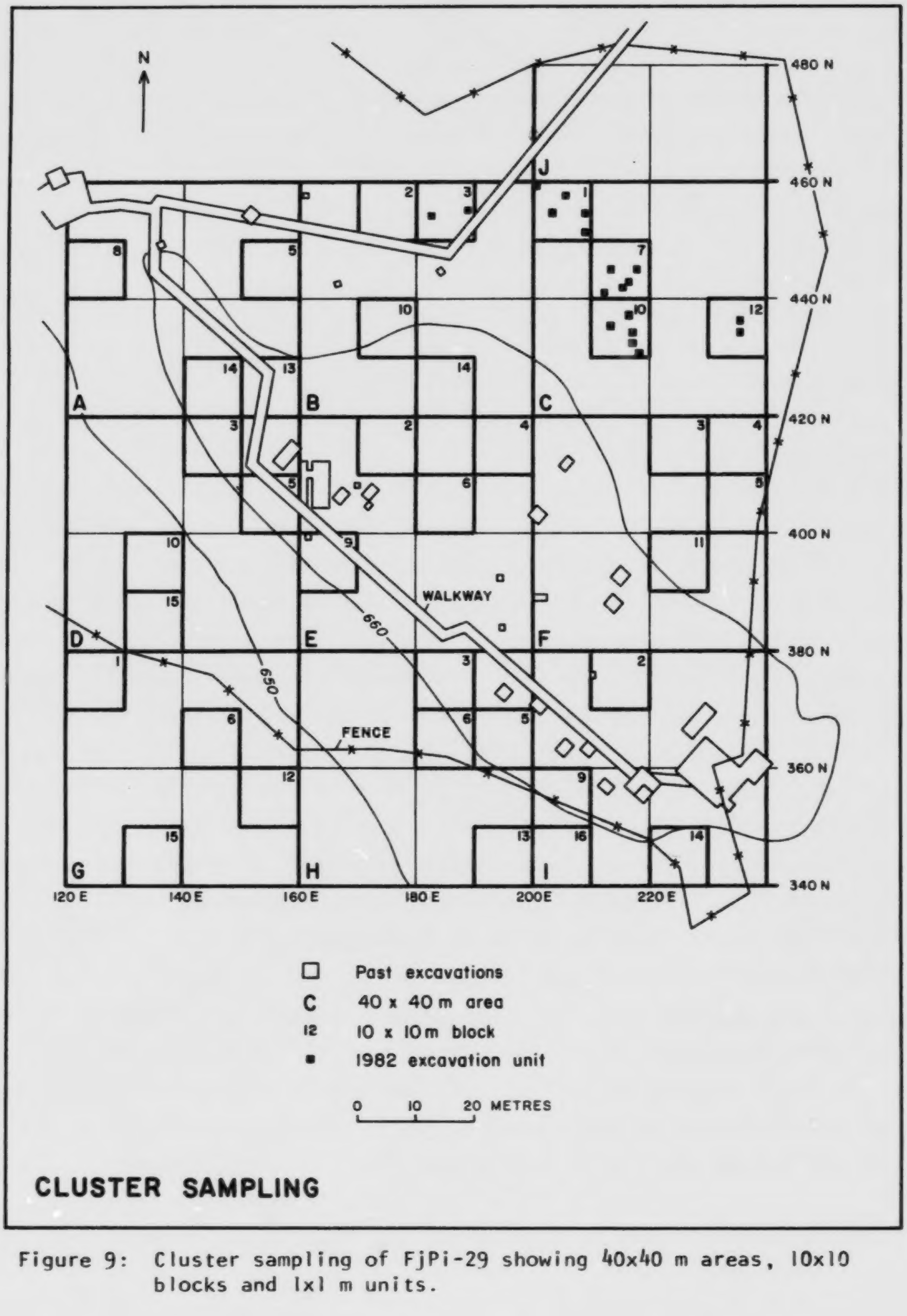

N
480 N
460 N
440 N
420 N
400 N
380 N
360 N
340 N
120 E
140 E
160 E
180 E
200 E
220 E
A
B
C
D
E
F
G
H
I
J
WALKWAY
FENCE
660
650
□ Past excavations
C 40 x 40 m area
12 10 x 10 m block
■ 1982 excavation unit
0 10 20 METRES
CLUSTER SAMPLING

Figure 9: Cluster sampling of FjPi-29 showing 40x40 m areas, 10x10 blocks and 1x1 m units.

Saskatchewan Sands and Gravels exposed in the deeply incised valley bottom of Pine Creek. To test the hypotheses that lithic workshops in the study area are principally correlated with locales where the Saskatchewan Sands and Gravels are exposed by the down cutting of streams and creeks flowing into the North Saskatchewan River, a probabilistic site survey programme was initiated in a region of the North Saskatchewan River Valley just west of Edmonton City limits. The research design for this project comprised two parts; the survey and an assessment of the distribution and the nature of the surficial cultural remains at each site location.

The survey strategy chosen to undertake a multi-stage stratified random sampling (Read 1979:58-59) of Township 51 Range 25 West of 4th Meridian (Figure 10). Four sampling strata were defined on broad physiographic grounds:

1. River Terrace
2. Creek Terrace
3. Secondary Drainage Terrace
4. Prairie

Each of the 36 sections within Tp51 R25 were assigned to one of these strata and sub-totals computed:

1.	River Terrace	N=6 sections
2.	Creek Terrace	N=6 sections
3.	Secondary Drainage Terrace	N=6 sections
4.	Prairie	N=18 sections

A 33.3% random sample of sections was selected from each stratum (Figure 10) and 1 km survey transects were chosen for examination within each of the selected sections (Figure 10). Random number derived grid points were used to select the origin and orientation of each transect. Survey transects were traversed on foot by teams of two or three persons. Sites located along these survey lines were recorded on standard Archaeological Survey of Alberta Site Inventory Forms, photographed and mapped.

To assess the nature and distribution of surface remains at each site located during this survey a 10x10 m grid was placed over each locality on a magnetic N/S orientation. Each grid unit was assigned a consecutive

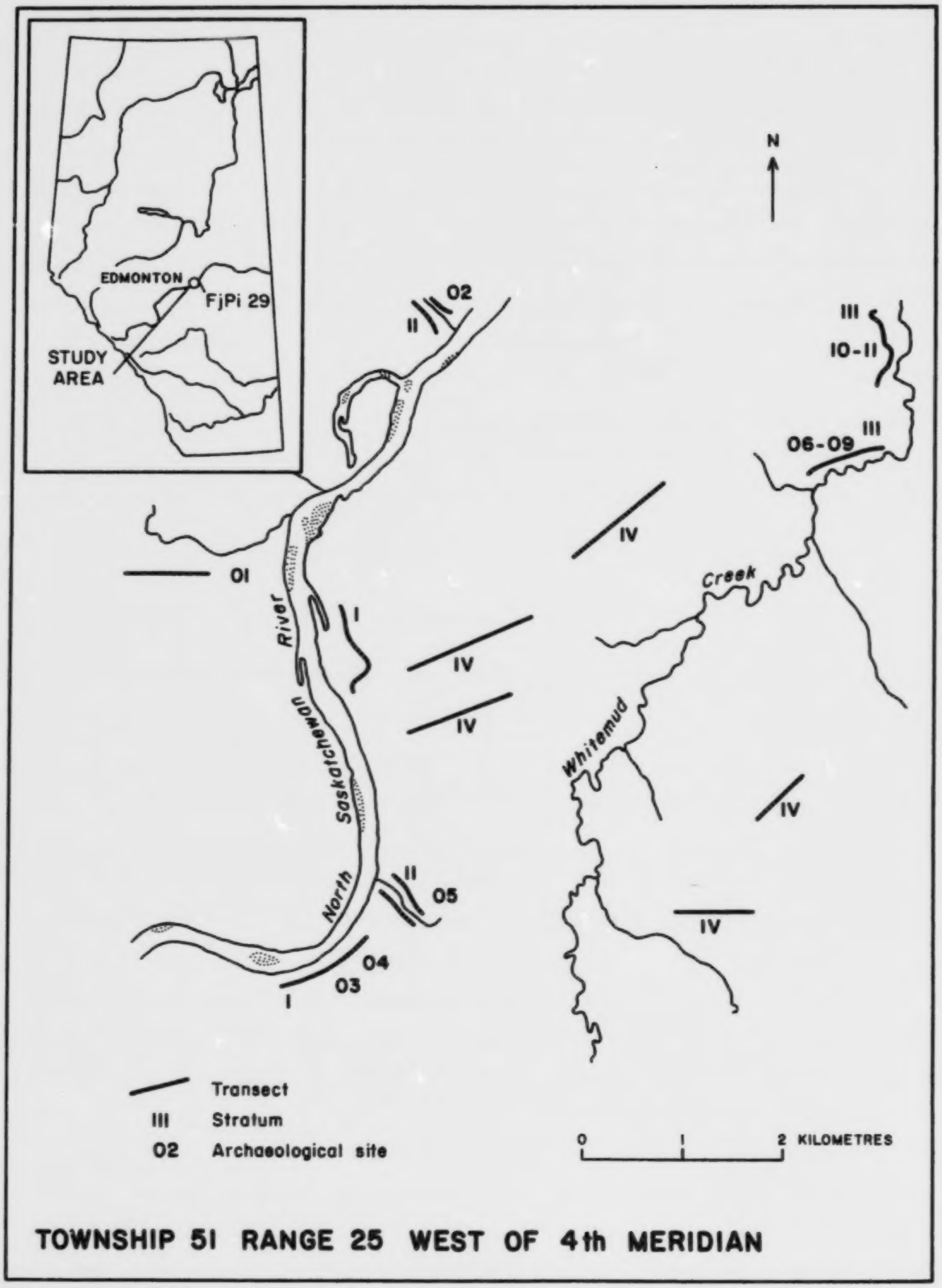

EDMONTON
FjPi 29
STUDY AREA
N
02
II
III
10-11
06-09
III
IV
01
I
River
Creek
IV
IV
Whitemud
Saskatchewan
IV
North
II
05
04
03
I
IV
Transect
III Stratum
02 Archaeological site
0 1 2 KILOMETRES
TOWNSHIP 51 RANGE 25 WEST OF 4th MERIDIAN

Figure 10: Stratified random sample transect and site locations.

number and a 5% random sample was selected for detailed examination. This examination entailed the intensive surface scrutiny of the 10 x 10 m unit and the recording of the frequency of individual artifact and raw material types present in each.

The objective of this survey programme was to determine if sites of different types (determined on the basis of physical size and characteristics plus the nature of the artifacts present) correlate with the various defined sampling strata. More specifically we were interested in discovering if sites associated with Stratum 2 (Creek Terrace) exhibit similar characteristics to FjPi-29.

RESULTS

Excavation

Excavations carried out between May 14 and September 7, 1982 centred on the four 10x10 m blocks in Area C and in one 10x10 m block in Area B (Figure 9). A total of nineteen 1x1 m units were excavated over the course of the summer; 17 in Area C and 2 in Area B. Completion of Block 12 in Area C was forestalled by a rise in the water table in this low lying area of the site which swamped the remaining three units slated for examination.

Analysis of the data obtained from the nineteen 1x1 m units excavated is currently in progress. The following comments must, therefore, be considered as preliminary observations.

Natural Stratigraphy

The soil profile most frequently represented in the units excavated in 1982 is that of an Orthic Black Chernozem (Canadian Soil Survey Committee, 1978). In some of the 10x10 m blocks in Area C (i.e. 7 and 10) the basic soil horizon sequence (Ah, Ae, Bt, C) was clearly represented though evidence of root and crytoturbic disturbance was apparent.

In two 1x1 m units in Block 7, Area C a buried Ah horizon was encountered in the upper portion of their profiles (Figure 11a). In other areas, most notably in Blocks 1 and 10, no clear distinction between the Ah, Ae and Bt horizons could be made (Figure 11b). Many of the units

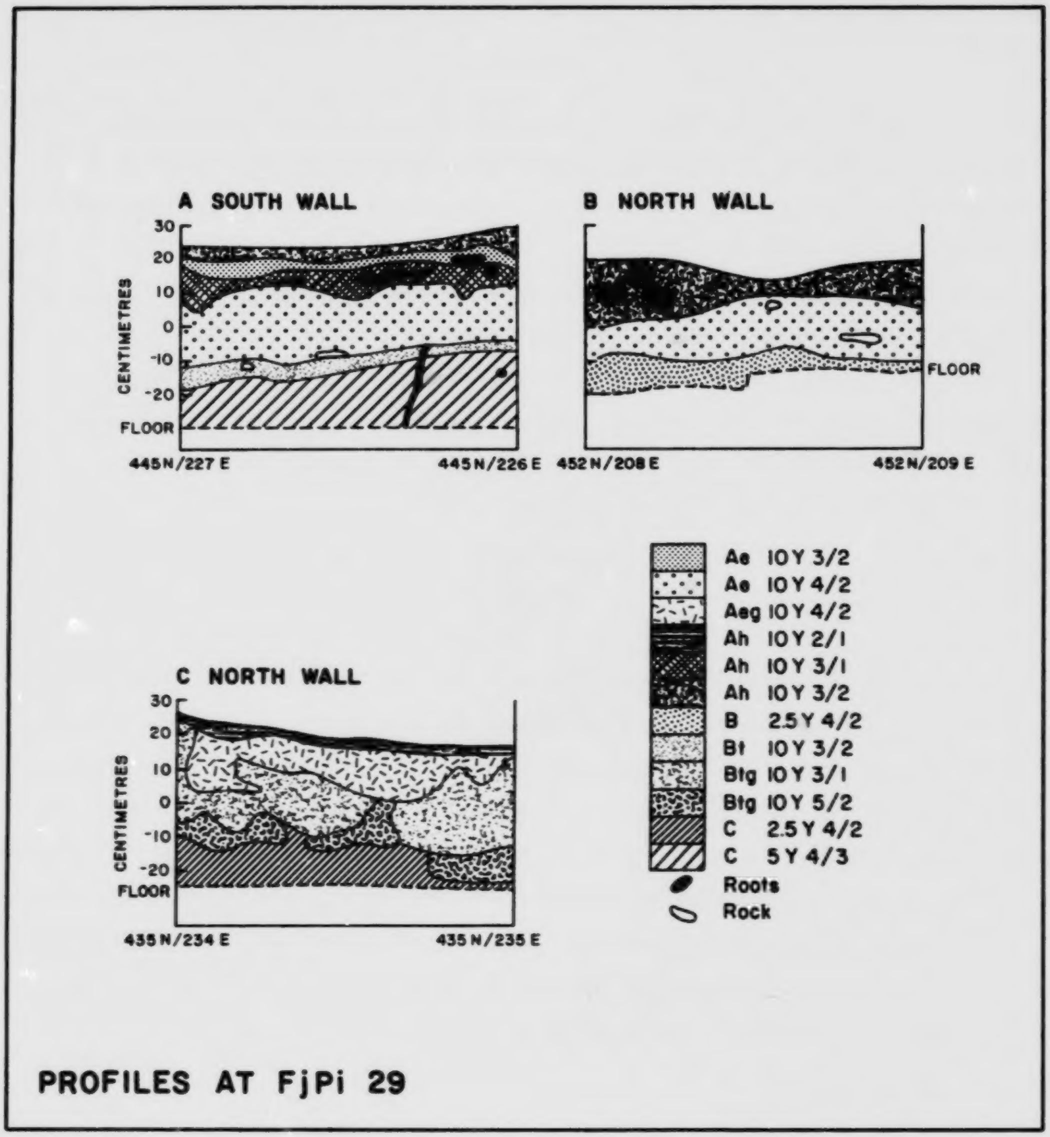

A SOUTH WALL
30
20
10
0
-10
-20
FLOOR
CENTIMETRES
445N/227 E
445N/226 E
B NORTH WALL
FLOOR
452N/208E
452N/209 E
C NORTH WALL
30
20
10
0
-10
-20
FLOOR
CENTIMETRES
435N/234 E
435N/235 E
Ae 10Y 3/2
Ae 10Y 4/2
Aeg 10Y 4/2
Ah 10Y 2/1
Ah 10Y 3/1
Ah 10Y 3/2
B 2.5Y 4/2
Bt 10Y 3/2
Btg 10Y 3/1
Btg 10Y 5/2
C 2.5Y 4/2
C 5Y 4/3
Roots
Rock
PROFILES AT FjPi 29

Figure 11: Soil profiles at the Strathcona Science Park site.

exhibiting such amorphous profiles were significantly disturbed by root action in the upper layers which may account for the lack of clear segregation of deposits.

In Block 12, in the extreme NE corner of the fenced portion of FjPi-29, soil profiles exhibiting characteristics most closely resembling those of a Luvic Gleysol (Canadian Soil Survey Committee, 1978) were encountered. This area is characterized by a localized depression which is water-filled during much of the spring and early summer. Although evidence of disturbance by frost action is indicated by frequent lobing of soil interfaces a clear progression of natural horizons can be identified (Figurellc).

Cultural Stratigraphy

As has been the case in all previous seasons at FjPi-29 artifacts were recovered in all levels from the surface humus layer to the upper surface of the sterile horizon (averaging ca 40 cm of deposit) and no discernable living floors were encountered. However, variations in the density of remains throughout the various profiles showed cultural stratification to exist in some of the areas examined in 1982. This supports Pyszczyk's results from his depth correlation for projectile points (1981).

Although quantification of results is as yet incomplete it is clear that in some units the greatest concentrations of artifacts occurred in the lowest levels of each unit. For example, in Blocks 1 and 10, an average of 25% of the total artifacts recovered from each 1 x 1 m unit came from the upper four levels and ca. 75% from the lower four levels. Driver, Haley and Kooyman (1982), noting a similar pattern in their results suggested downward displacement of materials due to rodent; frost or root action. However, the recovery in one of our excavation units of numerous fragments of FCR, occurring at the same lower levels, which could be refitted suggests that such disturbance factors do not account for this pattern. A more parsimonious explanation would be that in those specific areas where such concentrations have been documented, the major period of site utilization occurred early in the occupational sequence and that subsequent use of these areas was probably less intensive.

Artifact Remains

Analysis of the ca. 2000 artifacts recovered from the nineteen 1x1 m units excavated is on-going. However, some preliminary observations can be made:

1. The proportion of formed tools to lithic debitage is very low ranging from 1% to a high of 8% of assemblage totals by unit. Specific tool types recovered include a complete, though crude, quartzite Besant Point, the base of a finely worked basalt McKean Point, and a very finely worked end scraper made on the broken tip of a chert biface. Several quartzite flake scrapers, a number of large biface fragments (including at least two point preforms), some unifacial flake spall scraping tools, an assortment of edge-modified flakes and a variety of small hammerstones were also recovered.
2. Only a few cores and core fragments were obtained. The majority of these exhibit evidence of a bipolar reduction technique.
3. Among the various reduction categories of lithic debitage (which, as a group, represents 95% of the total artifact assemblage) angular shatter flakes and thinning flakes are the most abundantly represented forms.
4. Quartzite was clearly the favoured raw material for core reduction. This lithic type accounts for 75-85% of all unit assemblages. Chert and petrified wood, in that order, were the next most popular lithic types.
5. The fact that artifact densities vary vertically through the profiles of some units has already been noted. Variation through time in the intensity of use of these areas has been suggested as a possible explanation. This hypothesis received some support from data suggesting that artifact densities between the five 10 x 10 m excavation blocks samples also vary significantly. In Block 7 this average drops to ca. 80/100 items and in Block 10 to ca. 30/50 items. In Block 12, which unfortunately was

not completed due to flooding, over 200 artifacts were recovered from each of the 1 x 1 m pits excavated.

Although the results of past excavations cannot be directly compared to the 1982 data (because these excavations do not fit within the imposed sampling design) significant differences can be identified at a scale larger than the 10 x 10 m blocks. For example, Driver, Haley and Kooyman (1982), working in an area equivalent to our as yet unsampled 40x40 m Area E, recovered ca. 9,500 artifacts from 25 m^2 yielding an average density of 380 items per 1x1 m unit. Similar figures apply to Ives' (1980) results from the area falling within our sampling Area I. These data can be compared to the overall average of ca. 115 items per 1x1 m unit recovered from Area C in 1982.

It is clear from these preliminary observations that site utilization patterns do differ horizontally across the site. Subsequent investigation of these patterns will focus on a vertical/horizontal analysis to determine if trends through the depositional sequence follow the horizontal sequence.

Survey

A total of eleven sites were discovered in the course of the survey of TP51 Range 25 (Figure 10). A detailed description of the precise locational characteristics of these sites will be given in the final report of the 1982 season. The breakdown of the site totals by sampling strata is:

Stratum	Number of Sites
1. River Terrace	2
2. Creek Terrace	3
3. Secondary Drainage Terrace	6
4. Prairie	0

These preliminary results suggest that secondary drainage systems, in this case White Mud Creek, may have been favoured loci for habitation. Creek terraces may also have been significantly more frequently selected. No sites were uncovered in the Prairie Stratum suggesting this physiographic zone was less popular. It should be noted that survey in some cases was constrained by the presence of standing crops which hampered close scrutiny of the ground surface. This problem, however, was present in all strata.

Five of the eleven sites located were subjected to a 5% surface sampling of 10x10 m units as discussed in the methods section above. Six sites, unfortunately all located in the secondary drainage terrace stratum, were not sampled due to the presence of standing crops which the land owners did not want disturbed. The object of this sampling procedure was to obtain quantitative data for use in identifying possible correlations between site assemblage characteristics and physiographic location. The raw data obtained are summarized in Table 2.

It is impossible, at present, to derive significant conculsions from these data as comparative information from the six Secondary Drainage Terrace Sites is lacking. Attention may be drawn, however, to Site 5. As can be seen from Table 2 this particular site, located along the edge of a deep incised creek gully, is extremely large (estimated area = 84,176 m^2), it yielded a relatively high number of artifacts from the $10m^2$ sampling units (N=133) and it shows a breakdown of artifact categories suggesting that the complete lithic reduction sequence was practised at this locale. In all aspects, then, this site appears highly similar to the known characteristics of FjPi-29.

CONCLUDING REMARKS

This report outlines the major long term research goals of the University of Calgary's Archaeological Field School Programme at the Strathcona Site and summarizes the results of work completed during the 1982 field season. More complete documentation of these results will be forthcoming in the final report of the 1982 season. However, the preliminary observations provided in this report make it clear that the research strategy implemented this past summer will yield fruitful results both in terms of the intra site analysis of FjPi-29 and the placement of the Strathcona Site in a broader regional context. It is therefore recommended that, for the 1983 season, the cluster sampling of the fenced area of FjPi-29 be continued and that the stratified sample survey of TP51 be expanded to include a larger sample of transects to be investigated.

TABLE 2

RAW DATA FROM 5% SAMPLING OF SURFACE SITES

Site Number	Stratum	Estimated Area	10x10 Units	Number of Artifacts	Artifact Types	Raw Material
01	Creek Terrace	21,000m^2	10	5	1 core, 1 sec. decort. 1 thinning, 1 bone fragment	quartzite 100%
02	Creek Terrace	5,253m^2	3	0	n/a	n/a
03	River Terrace	18,725m^2	10	41	1 formed tool, 5 cores 1 split cobble,3 primary 3 second decort, 4 thin. 4 ridge, 20 bone frag.	quartzite 90.5% chert 4.7% basalt 4.7%
04	River Terrace	3,250m^2	2	7	1 core, 1 primary 3 shatter, 2 ridge	quartzite 85.7% chert 14.7%
15	Creek Terrace	84,176m^2	42	133	2 formed tools, 4 cores, 2 split pebbles, 20 primary, 29 sec. decort. 30 thinning, 2 retouch 19 shatter, 10 ridge, 14 bone frag	quartzite 86.6% chert 5.9% pet. wood 5.9% basalt 0.8% quartz 0.8%

A COMMENT ON BONE PEGS AND STONE CIRCLES

Permit 82-125

Roderick J. Heitzmann
Fedirchuk McCullough & Associates Ltd.

INTRODUCTION

Fedirchuk McCullough & Associates Ltd. carried out an archaeological testing program of EgOt-4, a stone circle site located 55 km south of Youngstown, Alberta (Figure 12). EgOt-4 is to be partially affected by the construction of a new right-of-way for secondary road 884.

EgOt-4

EgOt-4 is situated on a large upland 750 m northeast of Blood Indian Creek and 500 m south of a tributary of Blood Indian Creek. The topography and vegetation are typical of the short grass plains of the region. At the site there are two large stone circles. Stone Circle #1 has an outside diameter of 9.9 m on both the north-south and east-west axes, and is composed of approximately 130 rocks (Figure 13). Stone Circle #2 has an outside diameter of 11.4 m north-south and 10.5 m east-west, and is composed of approximately 155 rocks. Three well defined rock-lined hearths contained within the circle are aligned east-west.

METHODOLOGY

At EgOt-4 both circles were mapped, photographed and recorded. In addition, thirteen (N=13) 1 x 1 m units were excavated in and adjacent to Stone Circle #1 which is located along the western margin of the proposed right-of-way. These were chosen to sample the interior, exterior and the rim of the circle. Stone Circle #2 is located 7 m east of the

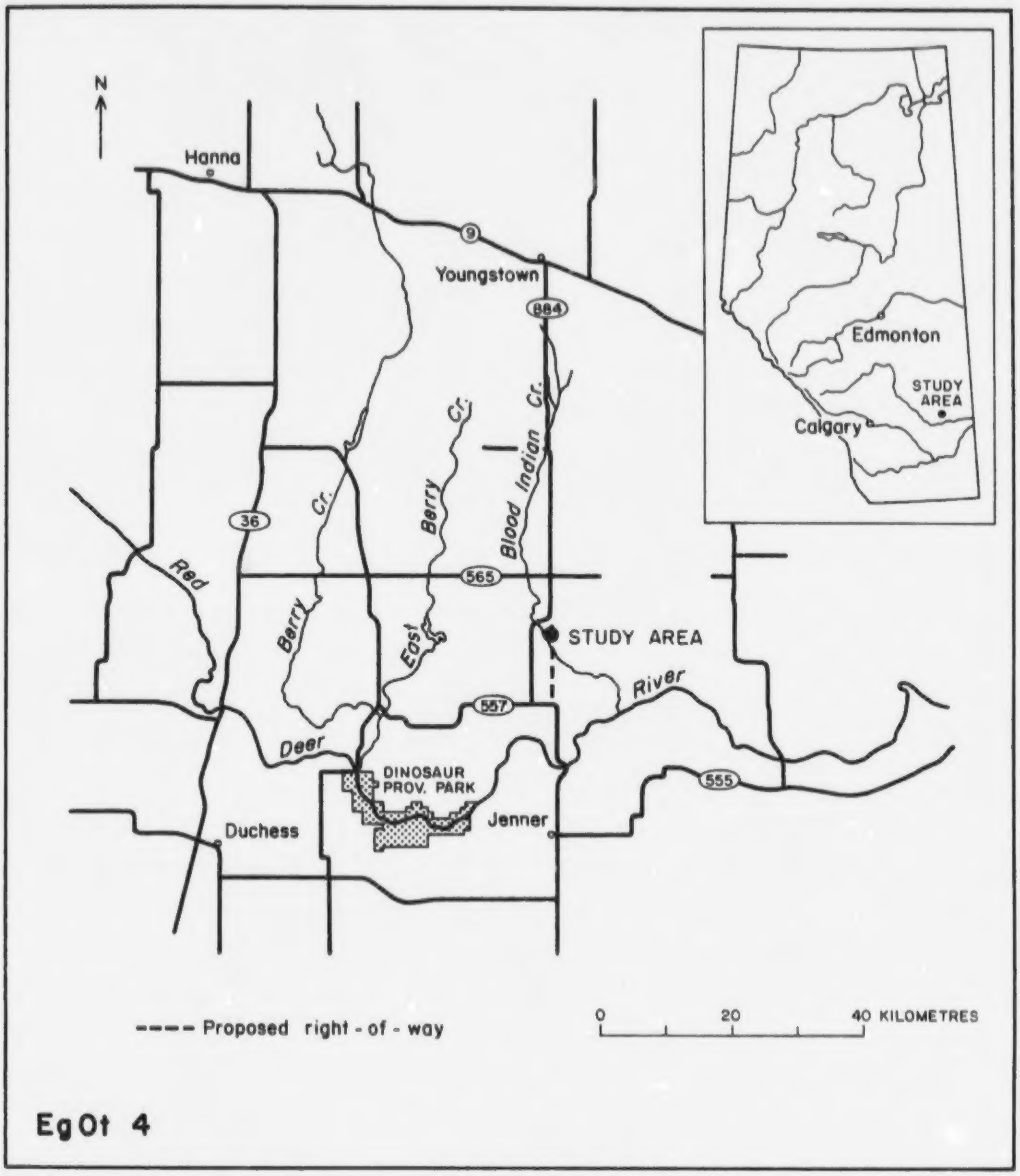

N
Hanna
Youngstown
9
884
36
565
557
555
Red
Deer
River
Berry Cr.
East Berry Cr.
Blood Indian Cr.
STUDY AREA
DINOSAUR PROV. PARK
Duchess
Jenner
Edmonton
Calgary
STUDY AREA
---- Proposed right-of-way
0
20
40 KILOMETRES
EgOt 4

Figure 12: Study area, EgOt-4.

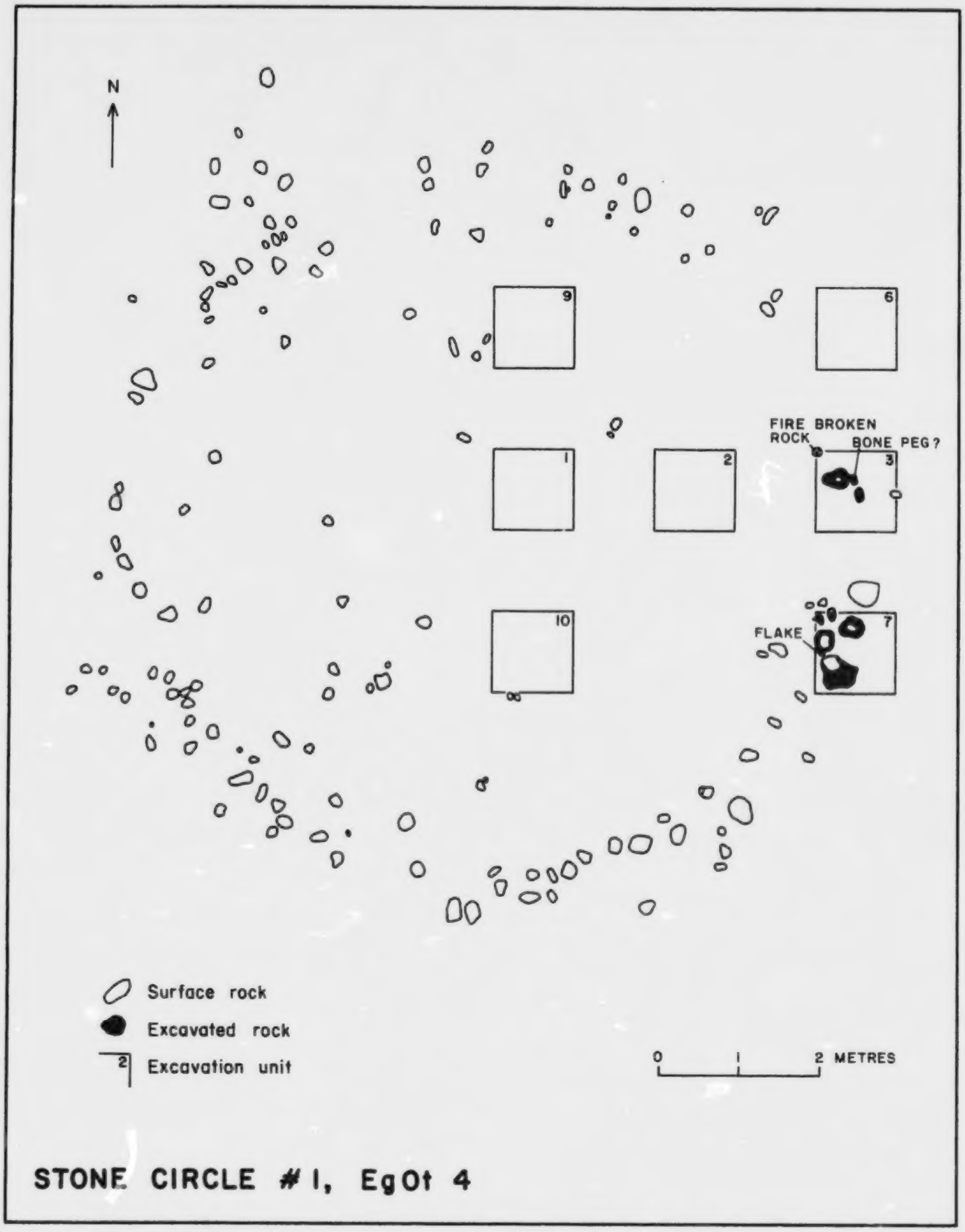

N
9
6
FIRE BROKEN ROCK
BONE PEG?
1
2
3
10
7
FLAKE
Surface rock
Excavated rock
2 Excavation unit
0
1
2 METRES
STONE CIRCLE # 1, EgOt 4

Figure 13: Plan of Stone Circle #1.

proposed right-of-way. No excavation was carried out on this circle as it lies outside of the right-of-way.

RESULTS

Fourteen artifacts were recovered in the archaeological excavation at EgOt-4. None of these can be dated or assigned a cultural affiliation. However, one item of interest was recovered; a bone peg which was located in Excavation Unit #3 on the eastern margin of Stone Circle #1. It was located on the outside of the ring of rocks (Figures 14, 15). This peg was unfortunately in a very poor state of preservation and disintegrated rapidly when exposed to the air.

BONE PEGS AND STONE CIRCLES

"All tipis require a method of anchoring them to the ground" (Finnigan 1981:29). The most common devices are stones, sod, wood or pegs placed along the lower edge of the hide cover.

While numerous other stone circles have been excavated in Alberta and the northwestern Plains (Quigg 1979, 1982b; Finnigan 1981) bone pegs in situ have not been previously recorded. Bone pegs (N = 51) have been reported and described from EcPn-2 near Longview, Alberta (Wilson 1977:188). Most of the pegs were made of rib, scapula, and long bone elements. Although these were not found in situ, Wilson speculates that they may have been used to anchor tipis.

> Historically, pegs were used except when the ground was frozen or too stoney. Tipi pegs are about 42 cm long and 2 cm in diameter (Wissler 1910:104), and one or two pegs are required for every meter of circumference. (Finnigan 1981:29)

At EgOt-4, the bone peg was found in association with the stone circle. This need not be considered an unusual pattern as both pegs and rocks are shown in an 1895 photograph of a tipi (Figure 16).

Brasser seems to view a temporal relationship in the use of pegs as tipi anchors when he observes, "In more recent times the latter method [stone weights] was replaced by the use of pegs (1982:310). This may be

Figure 14: Photo of bone peg on the outside of Stone Circle #1.

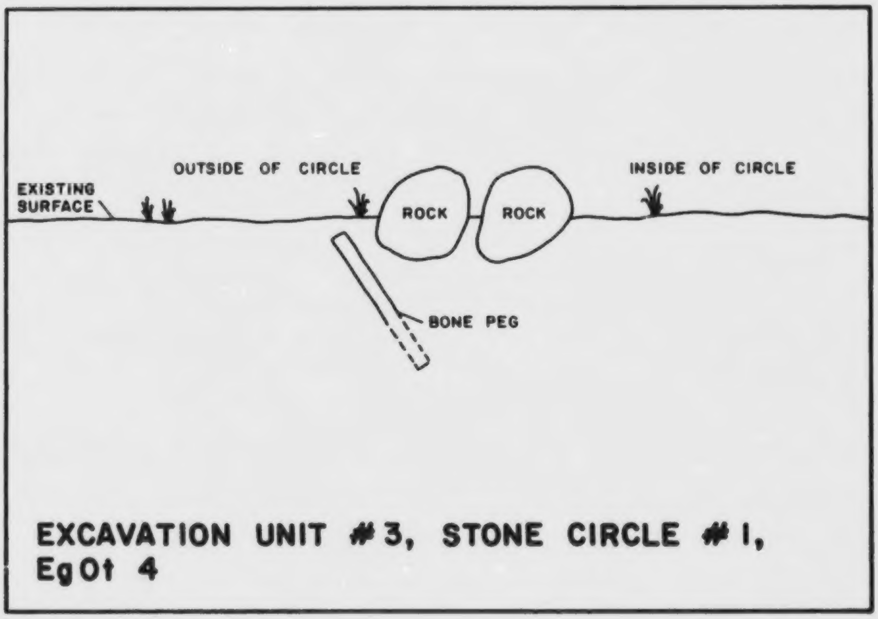

OUTSIDE OF CIRCLE
INSIDE OF CIRCLE
EXISTING SURFACE
ROCK
ROCK
BONE PEG
EXCAVATION UNIT #3, STONE CIRCLE #1, EgOt 4

Figure 15: Schematic cross-section of the placement of bone peg at EgOt-4.

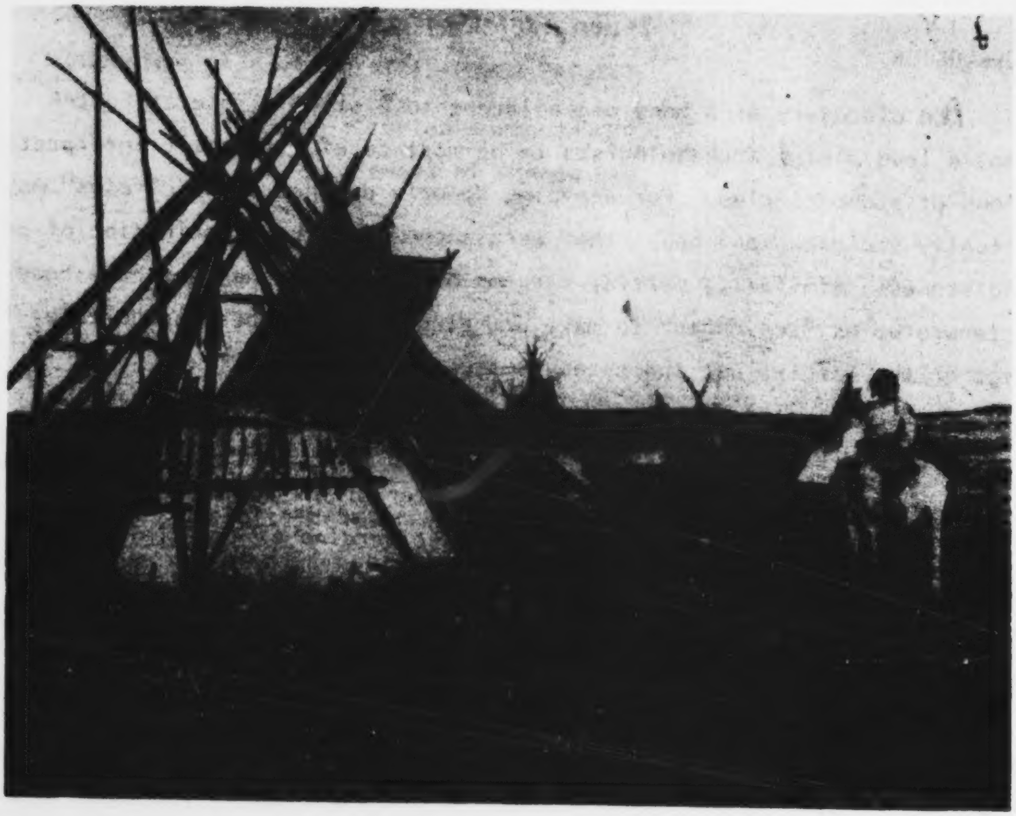


Figure 16: Photograph of Joe Bear Cap, Sarcee, in camp, ca. 1895. The photograph was taken by Rev. J. W. Tims, Anglican missionary. (Glenbow Archives NA-1020-34). Note the tipi is anchored with both pegs and stones.

oversimplistic as both pegs and stones occur simultaneously at EgOt-4 and also in the photograph noted above (Figure 16).

CONCLUSION

The discovery of a bone peg adjacent to a stone circle at EgOt-4 should lead plains archaeologists to be more careful in their interpretations of stone circles. For example, "poorly defined stone circles" may actually indicate tent bases that were anchored with a combination of pegs and stones. Similarly, partial circles or arcs of stone that have been interpreted as "scavenged" to make new rings may have been anchored by pegs on the margins not indicated by stones.

The location of the bone peg on the outside of the stone circle at EgOt-4 should also be considered by those who assume that the stones of a circle were placed exclusively on the exterior of the tipi (Finnigan 1981:33). There is no reason why the lower margins of the tipi cover could not have been rolled inward between the tipi poles and the rocks placed on the inside of the tipi cover. A series of pegs could have also been placed along the outside margin.

Both Stone Circles #1 and #2 are large, with inside diameters of 8.4 m and 9.4 m respectively. From these diameters it is possible to estimate the number of people who could occupy these tipis. Using the formula provided by Finnigan (1981:39) we can estimate that as many as 28 people could occupy Stone Circle #1 and 31 people could occupy Stone Circle #2. This significantly exceeds the mean figure of 9.45 people per tipi reported by Finnigan (1981:109). It suggests that tents constructed at EgOt-4 may have been ceremonial type described by Mandelbaum for the Plains Cree.

> A structure used only for certain dances was wewahtahoka.n literally "joined together tipi". It was a tipi framework so large that two covers were needed to enclose it. (Mandelbaum 1979:90)

Only further research at the site can establish if this is valid.

HISTORICAL RESOURCES IMPACT ASSESSMENT AND CONSERVATION STUDIES, GENESEE POWER PROJECT

Brian Ronaghan
Lifeways of Canada Ltd.

INTRODUCTION

Approximately 50 km southwest of Edmonton near the hamlet of Genesee, Edmonton Power and Fording Coal Ltd. plan the development of a major coal mining and electricity generating project (Figure 17). The project involves the construction of a number of facilities including a plant site, cooling pond, dykes, pumping facilities and various pipelines and powerlines in addition to requiring the relocation of Secondary Road 770. The permit area for the project is a large block covering slightly less than 28 square miles (72.52 sq. km) adjacent to the south rim of the North Saskatchewan River Valley.

A preliminary archaeological inventory of a limited portion of the project area was undertaken in 1977. This study resulted in the recording of 22 prehistoric sites representing 34 discrete occurrences (Reeves 1977). With regulatory approval for the project having been obtained, a more intensive inventory level study was conducted in 1981 throughout large portions of the project area (Van Dyke and Damp 1982). Although inventory was incomplete, 291 prehistoric sites had been recorded by the end of the 1981 field season.

A one year advance in construction schedules necessitated archaeological studies involving inventory, assessment and conservation excavation in specific project areas in order that these areas might be released for development by the end of winter 1982. This report summarizes the goals, methods and initial findings of the 1982 archaeological field program on

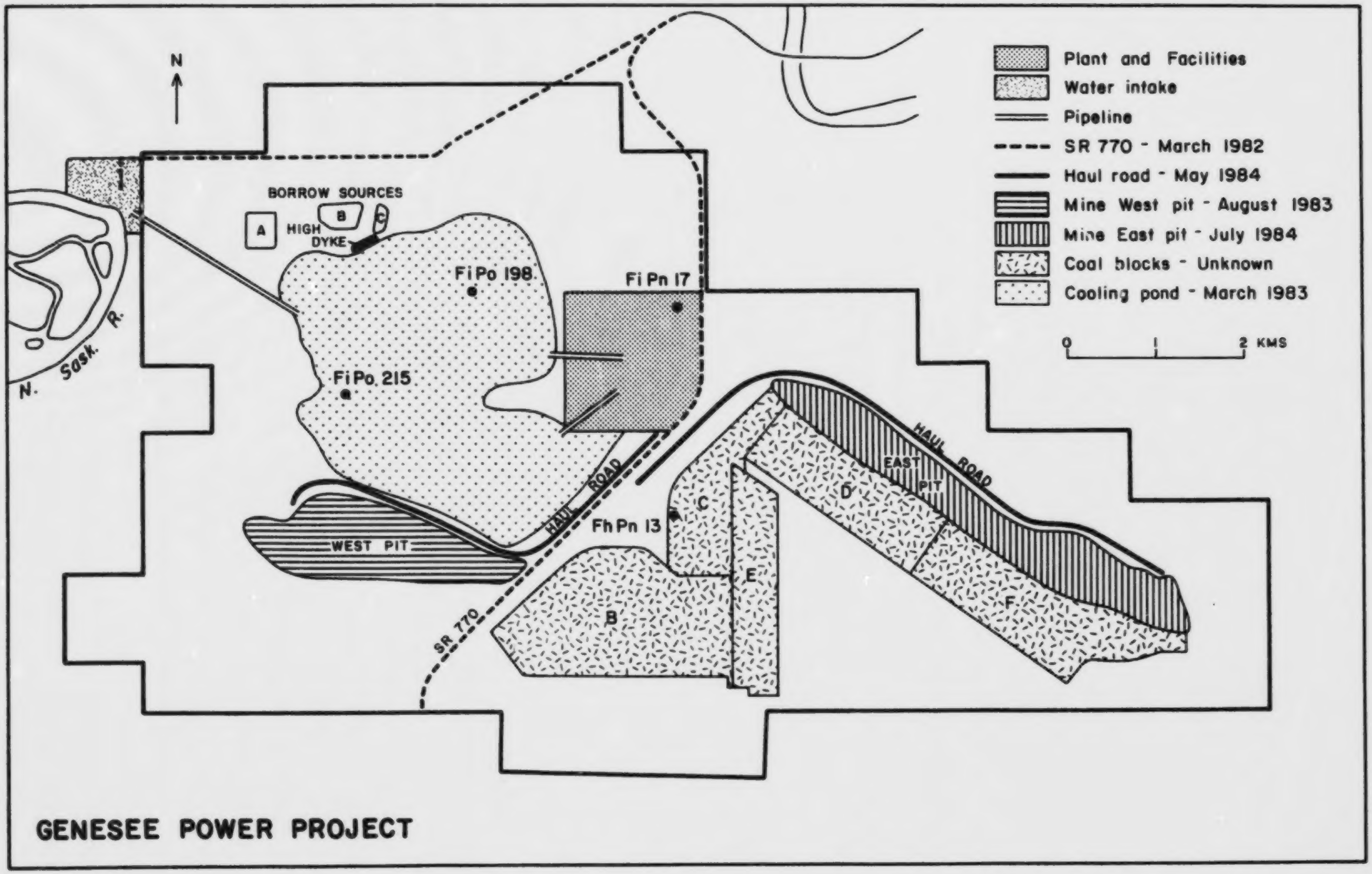

N
BORROW SOURCES
A
B
C
HIGH DYKE
Fi Po 198
Fi Po 215
Fi Pn 17
Fh Pn 13
N. Sask. R.
WEST PIT
HAUL ROAD
SR 770
EAST PIT
B
C
D
E
F
Plant and Facilities
Water intake
Pipeline
SR 770 - March 1982
Haul road - May 1984
Mine West pit - August 1983
Mine East pit - July 1984
Coal blocks - Unknown
Cooling pond - March 1983
0
1
2 KMS
GENESEE POWER PROJECT

Figure 17: Study area, Genesee Power Project.

the Genesee Power Project.

THE GENESEE POWER PROJECT: IMPACT ON HISTORICAL RESOURCES

The amount of land surface which will be disturbed over the lifespan of the project is enormous. Construction and mining operations will remove large portions of the densest concentration of prehistoric sites recorded to date in the parklands area of Alberta. Development activities are scheduled such that, in areas proposed for mining operations, considerable time will be available to implement archaeological studies well in advance of land disturbance.

Four major construction programs were scheduled for commencement or completion by winter 1982 (Figure 17). The initial phases of plant site construction were begun in early spring and involved a section of land wherein 25 previously identified prehistoric sites were located. The relocation of Secondary Road 770 was begun in spring and completed by late fall. This development required assessment of several locations containing borrow required for construction, and conservation studies at a number of known and newly recorded prehistoric sites which would be impacted. Construction of a high dyke for the cooling pond was scheduled for early summer and necessitated large amounts of borrow from outside the cooling pond itself. Major archaeological studies were required in these areas to identify, assess and mitigate this impact. Finally initial forest clearance and preparatory construction in the cooling pond [approximately 3 sq. miles (7.7 sq. km)] was scheduled to commence in November 1982. More than half of the cooling pond had yet to be inventoried and 52 previously recorded sites located within the cooling pond boundaries required assessment.

Although all previously recorded sites occurred in a plow zone context, their number, and their variation in size, content, and location, were indicative of the presence of a major prehistoric settlement pattern in the Genesee area. It was apparent that construction activities scheduled for 1982 would obliterate the major portion of this significant regional historic resource base. Rapid decisions resulting from a constant liaison between Edmonton Power, the Archaeological Survey of Alberta (ASA) and

Lifeways of Canada Limited produced the archaeological study program outlined below.

ENVIRONMENTAL BACKGROUND

Genesee is a unique topographic area in that the central basin represents the remains of a preglacial (Tertiary) river channel from which the North Saskatchewan River had been diverted by Wisconsin glacial activities. Coal-bearing strata remain uneroded in ridge structures which flank this old valley in the northern and sourthern portions of the project area. Paskapoo Formation bedrock and glacial tills are blanketed by Glacial Lake Edmonton silts throughout most of the project area with outwash sands and gravels being present in the north and west. Ridges exhibit relatively broad, flat tops with numerous, narrow, sloping terraces. Small kettle bogs exist in the depressions on ridge tops and on the broader terraces as a result of the impermiability of the lacustrine silts and clays.

The central basin is characterized by large numbers of small knolls separated by low wetlands. Both small and large areas of bog exist here, as well as large numbers of small drainages connecting eventually to Genesee Creek the major drainage outlet for the basin. This creek exits the basin in the north central portion of the study area after having cut through the major northern coal-bearing ridge structure. Due to the low elevation and limited outlet, the basin itself forms a large moisture trap which was of undoubted importance to game animals and their prehistoric hunters.

The Genesee project area is located in the northern portion of the parklands ecotone in terms of present day vegetational/climatic zones. Fluctuations in the boundaries of this ecotone during past climatic episodes is of critical importance for interpretation of prehistoric occupations of the area as it is thought that grasslands extended well beyond the Genesee area at various times in the past.

RESEARCH GOALS

The results of the 1981 inventory level reconnaissance study had barely been reviewed by the ASA when the advancement of construction schedules necessitated the immediate implementation of field work to mitigate impacts to sites located in the study area. Initial research goals were established on the basis of the known characteristics (albeit limited) of the prehistoric data base, and through consultation with the Archaeological Survey of Alberta.

Previous knowledge was such that limited systematic information was available regarding site size, contents or character. It was not known whether activity clustering could be recognized in the plow zone sites or whether undisturbed cultural deposits occurred below the plow zone. Additionally little was known about the temporal distribution of the sites. Consequently, early conservation studies conformed to the dual goals of conservation of significant historic resources and methodological concerns with regard to plow zone sites in the parklands.

Initial results from conservation studies on a major plow zone site (FiPn-17), and concurrent impact assessments in various proposed borrow sources, indicated an overall research design was necessary to structure subsequent studies. Sites (more properly archaeological localities) occurred in greater numbers, exhibited higher densities and more significant functional and chronological variation than expected. Furthermore plow zone sites had yielded what appeared to be discrete activity clustering.

A final research design (Reeves, Ronaghan and Van Dyke 1982) superceded an interim field program which had been adopted while new information was being assessed. Two first order research goals were identified; 1) the establishment of a culture history for Genesee, 2) the determination of why sites are located where they are. These general goals were subdivided into a series of potentially answerable research questions.

Research questions with regard to the first goal were stated in the form of hypotheses generated from current archaeological thought and revolved around examination of formal and technological relationships between the major cultural historical units which had been recognized in the region. Presently we have evidence for the fluted point tradition, the Plains - Mountain Tradition, the Cody Complex, the Mummy Cave-Oxbow Complex, the McKean Complex, the Taltheilei Shale Tradition, and the Late Plains

Tradition.

Questions regarding the second goal were broken down into two aspects: 1) the first asks what determining effect topography had on the settlement pattern exhibited in the Genesee basin and the surrounding ridges and 2) the second asks what were the effects of vegetational changes during the Altithermal and Neoglacial episodes on settlement in the basin. Examination of these questions will largely rest on our ability to recognize the age and function of site assemblages.

Recognition of potential problems in terms of our ability to firmly date site activity clusters, and to demonstrate discreteness in plow zone situations, resulted in a field program highlighting the maximization of data collection. Because of scheduling problems, it was necessary to carry out inventory, assessment and mitigation concurrently in various project areas. This was made possible through close liaison with the ASA. However, the resultant absence of knowledge regarding the complete population of sites precluded the use of sampling procedures in approaching our research goals.

Inventory involved judgemental shovel testing in treed areas and pasture lands which had not been broken prior to examination. Plowed fields, stubble fields, and pasture land were disked at least twice prior to visual examination using a four wheel drive tractor with a 30 ft. (9.14 m) disk. After some weathering, fields were visually examined and sites recorded.

On the basis of this information, sites were evaluated as to whether detailed assessment was warranted. Criteria used in site evaluation involved whether the site could potentially contribute to the solution of one of the research questions, and general significance criteria (size, contents, variability, uniqueness, etc.). In effect a fairly subjective site significance seive was put into operation.

As implemented, the assessment stage of the program allowed sufficiently detailed information to be obtained from significant sites to provide a firm basis for recommending either further detailed mitigation studies or release of the sites for development. Furthermore, the procedures provided a consistant and inclusive data set which would be necessary for later analysis.

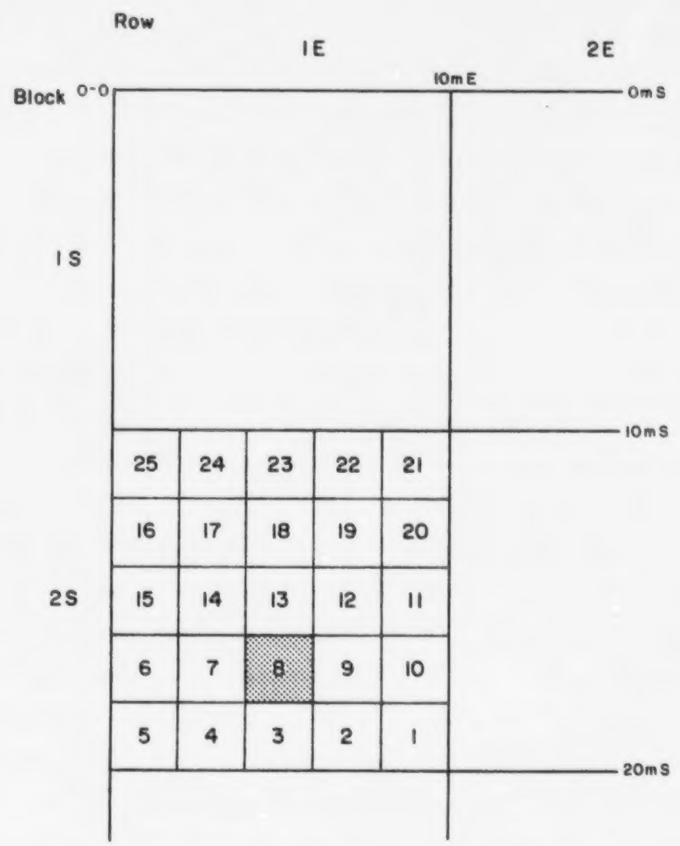
Detailed assessment in undisturbed forested sites involved systematic (10m grid) shovel testing and test excavation using 1/4" (0.64 cm) mesh hand or motorized screens. In the vastly more numerous plow zone sites, controlled surface collection of a 100% sample and limited test excavation constituted procedures undertaken in this stage of the program.

Controlled collection involved the following operations. Each selected site was gridded into 10 m blocks. Surveyors shot in base lines 100 m apart along an east-west axis and marked in 10 m intervals; 100 m chains were stretched between 10 m intervals on the base lines creating collection rows oriented north and south and numbered east to west. Crew members then walked between the chains flagging all observed lithics, bone and fire broken rock. Ten metre markings along the chains delineated each major 10 x 10 m collection unit. Smaller collection units were established initially by placing a flexible rope grid of 2 x 2 m squares over the 10 x 10 m unit: the 2 x 2 m squares within the grid were numbered 1-25 in the manner of legal sections within townships.

Collected artifacts were numbered with the site Borden or field number, their row east or west, their block north or south and the appropriate collection square. Figure 18 depicts the hypothetical 2 x 2 m location of a collected artifact. As the number of sites to be collected increased, the use of the rope grid became overly time consuming and cumbersome. It was replaced by flagging 2 m intervals along the chain and pacing to the appropriate square.

Artifact density/distribution graphs were created in the field in order that areas of concentration or diagnostic artifacts could be accurately plotted and areas for test excavation chosen. These were also necessary for formulating in-field recommendations for final mitigation studies at selected sites. Recommendations for further mitigation studies on undisturbed sites in the cooling pond and high dyke areas were based on rough counts and cursory examination of artifacts obtained in test excavation.

Final mitigation requirements were determined in consultation with the ASA. In making these decisions, sites were approached on an individual


Row
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2E
Block
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10m E
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11
6
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2
1
20m S

82-99 (SITE FIELD NUMBER)

Figure 18: Hypothetical location of a single collected 2x2 m square, Row 1E Block 25 Square 8.

basis using criteria involving: 1) whether the site could contribute toward the resolution of a research question and, 2) general aspects of conservation (e.g., inadequate initial samples, unique concentrations or features, high densities of artifacts, lack of temporal diagnostics, lack of controlled samples etc.).

Avoidance was possible only on two sites in the high dyke area (FiPo-138 and FiPo-178). Active mitigation procedures on plow zone sites involved uncontrolled collection of sites not selected for a controlled sample, searches for additional diagnostics, retilling and second controlled collection, small block excavations and large block excavations (Figure 19: FiPn-17, FiPn-13, FiPo-125). In undisturbed sites, mitigation took the form of either small or large block excavations (Figure 17: FiPo-98).

RESULTS

The 1982 field program required approximately six months to complete and resulted in the recovery of an enormous amount of data on prehistoric occupation in the central portion of the project area. Inventory studies resulted in the recording of a total of 242 new prehistoric site locations bringing the total recorded to date within the project area to 533. In the course of the 1982 field program 76 previously recorded sites were also revisited and assessed.

In plowed field sites, 77 controlled surface collections were undertaken, searches for additional diagnostics were conducted on 21 sites, 13 sites were retilled and had second controlled collections, nine small block excavations were completed and three major block excavations were conducted. With regard to treed sites, two small and five larger block excavations were undertaken.

Although final counts are not available at this time, it is estimated that between 60,000 and 70,000 lithic artifacts were collected in 1982. Included in these totals are in excess of 200 projectile points ranging in style from a single fluted point, through various Early and Middle Prehistoric Period point styles, to late period arrow points and styles related to the Taltheilei Shale Tradition. Because analysis is far from complete and typological questions are unresolved, we have chosen to illustrate only the fluted point for the purpose of this report (Figure 19a).

Lithic assemblages are characterized by large numbers of bifaces of various forms (in excess of 1000 were recovered) and large quartzite expediency tools. Smaller formed tools occur but in lesser proportions. These include scrapers, drills, wedges and retouched flakes. The unique occurrence of a microblade core manufactured from a type of Montana chert is notable at one of the smaller sites (Figure 19b). Flakes and debitage of local quartzites are the largest component of all sites in Genesee.

Lithic source materials are primarily local quartzites. A white (and reddish oxidized) fossiliferous chert is a secondary component of many site assemblages. Exotics are rare, but include various cherts, chalcedonies, Knife Rvier flint and obsidian.

Bone is rare as a result of acidic soils, but was identified at most sites in the form of small unidentifiable fragments. Three ceramic sherds were recovered, one of which is illustrated here (Figure 19c).

Fire cracked rock was identified in limited quantities on many sites. Cultural features were also rare, likely because of the plow zone nature of most sites. Two circular, flake-filled depressions were discovered below plow zone in the high dyke area; and a fire cracked rock, and a burned bone concentration were also identified at two of the excavated undisturbed sites.

ANALYSIS

Because of the large number of artifacts, cataloguing and analysis will form a major component of this year's work. We have chosen to catalogue and simultaneously assign types to all debitage; tools will be reserved for a more in-depth analysis.

Debitage types will be determined on the basis of a series of structured hierarchical decisions regarding lithic source, debitage type, shape, size, and production characteristics. As a result, each artifact will be defined by an alpha-numeric code composed of the decisions made throughout the heirarchical classification system. This system is especially suited

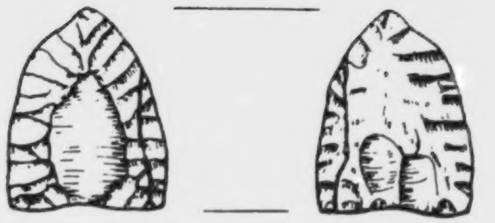


Figure 19a: Quartzite fluted point recovered in surface collection of FiPo-266. Actual size.

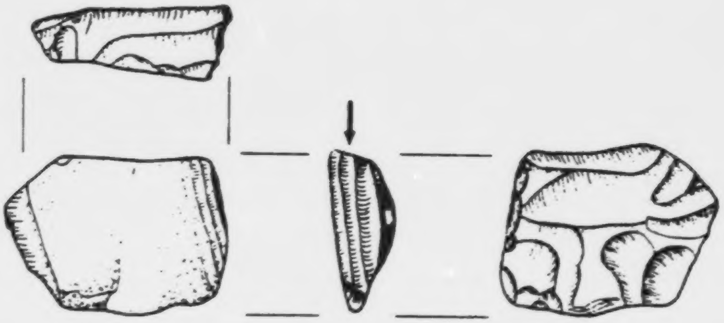


Figure 19b: Montana chert microblade core recovered in surface collection of FhPn-101. Stippling shows chert patination. Actual size.

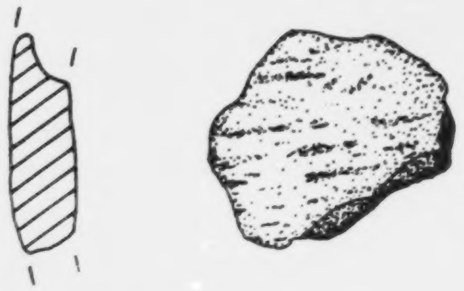


Figure 19c: Cord impressed ceramic body sherd recovered in surface collection of FiPo-167. Actual size.

for subsequent computerized manipulation of the data.

Tool analysis will concentrate on establishing morphological and functional types which are characteristic of the Genesee data base. The intent is to highlight the variation in the samples in order that chronologically sensitive tool types might be recognized and used to assign relative dates to assemblages which lack the usual temporal indicators. This is critical to solving culture history questions posed in the research design. Similarly, recognition of variation in site function will aid in locational analysis which is, in turn, necessary to define settlement patterns.

CONCLUSIONS

The 1982 field season in the Genesee Power Project was one of the largest ever conducted in Alberta archaeology and may be the largest single-season plow zone archaeological study conducted to date in North America. Because of the characteristics of the archaeological data base, comparison with plow zone studies conducted in other areas is difficult. Site locations were distributed over an area of approximately four square miles. Site assemblages varied from fairly sparse to extremely dense, from singular to quite varied in material culture characteristics, and from fairly homogenous scatters to those exhibiting unexpectedly discrete clustering. Temporal diagnostics indicated a potential 12,000 years of cultural occupation. Initial interpretative studies presently underway will, however, attempt to establish a chronological framework for the Genesee basin, define the characteristics of the occupations, and analyse the site distribution.

The archaeological data obtained in 1982 on the Genesee project is believed to have considerable significance for the interpretation of Alberta prehistory, especially as it relates to the parklands area. This is true not only because of the wealth of cultural material recovered, but also because of the intensive and controlled manner in which it was obtained. The Genesee data is also of methodological significance since the problem of mixing inherent in plow zone sites is shared by much of the Plains and Boreal Forest area. The results of field and anayltical techniques employed in this study will aid in designing future research in plow zone situations throughout the province.

THE BLACK FOX ISLAND PROJECT, END-OF-SEASON REPORT

Permit 82-66

Kathleen Connor Learn

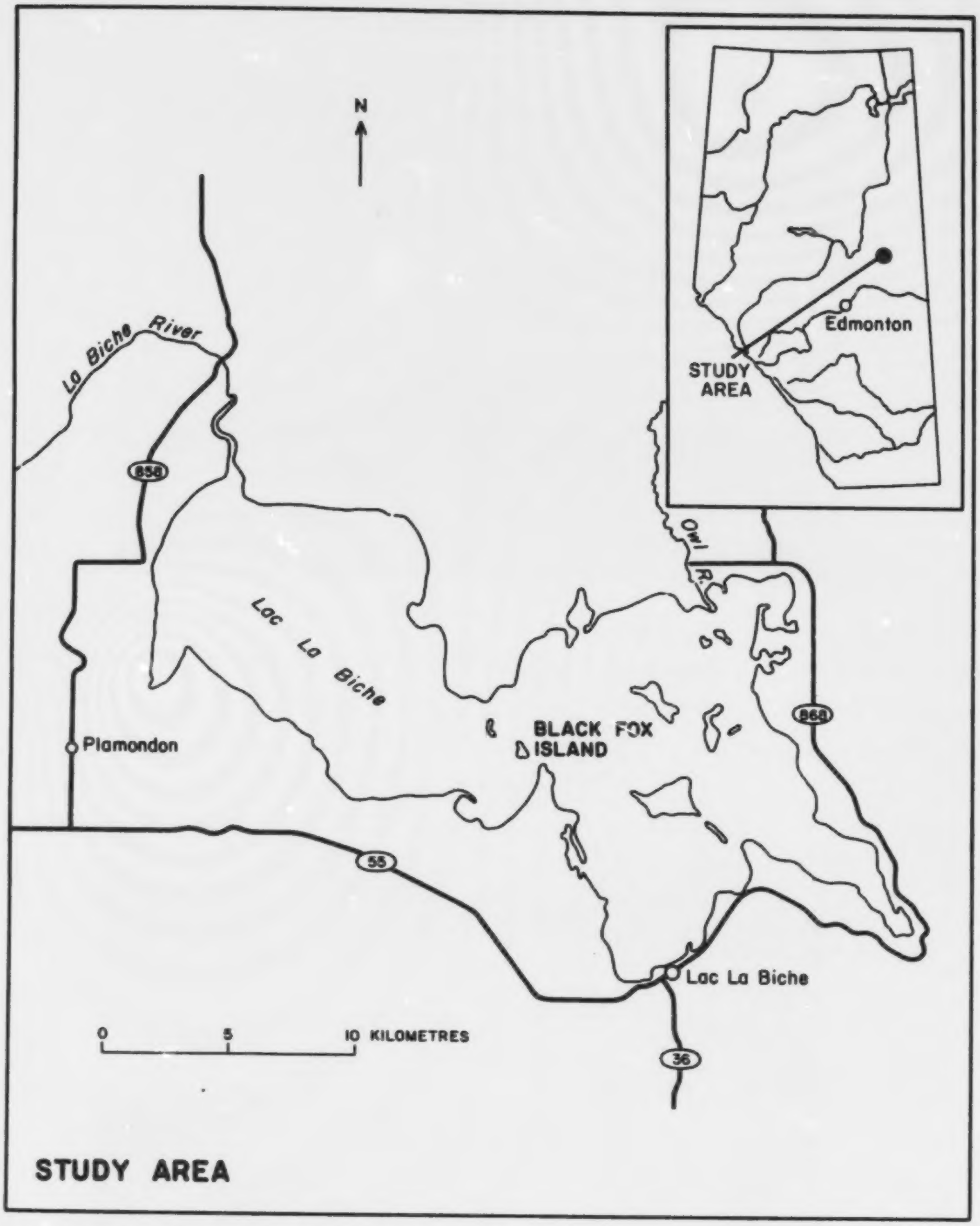
INTRODUCTION

Archaeological investigations were conducted on Black Fox Island, Lac La Biche, from July 12 to August 20, 1982, under the direction of the author. Testing activities for the entire island and for a known pottery-yielding site, GfPa-32, were planned in an attempt to evaluate the extent of the prehistoric component on Black Fox Island, and to explore its potential significance for northeastern Alberta's prehistory.

Environmental Setting

The Lac La Biche region (Figure 20) is topographically within the Eastern Alberta Plains, and vegetatively within the mixed wood section of the Canadian Boreal Forest Region. The climate is characterized by cold winters and short, cool summers. Lac La Biche is a shallow lake, 72 feet maximum depth and approximately 21 miles in length. The islands within the lake are all concentrated in the eastern portion of the lake.

Black Fox Island (Figure 21) shares common topographic and vegetational features with the shoreline of the mainland, approximately one quarter mile to the south. Approximately two-thirds of the island's shoreline is characterized by an erosional bluff which at the present time, overlooks a cobble and/or till beach (Figure 22). The predominant tree species is poplar, with secondary amounts of birch and saskatoon trees, and dogwood and willow shrubs. The island has much topographic diversity ranging from the high elevations of shoreline bluffs and several ridges and knolls in the island's interior to low elevations


N
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856
Lac La Biche
Plamondon
BLACK FOX
ISLAND
Owl R.
868
55
Lac La Biche
36
0
5
10 KILOMETRES
Edmonton
STUDY
AREA
STUDY AREA

Figure 20: Location of Black Fox Island project.

Figure 21: Black Fox Island, south shore.

Figure 22: View of GfPa-32 atop bluff on eastern shore of Black Fox Island. Site is at extreme left in photo.

around a small inland lake in the center of the island and associated swampy, low-lying terrain. Soils on the island have sand and clay components, and are not highly acidic as is usually the case with Boreal Forest soils.

The island is host to a great variety of birds in the summer, including pelicans, seagulls, terns, blue heron, ducks, and various species of smaller birds. There was not much evidence observed for the presence of small mammals other than several burrows. The island is also reportedly a game track for large mammals to swim and"island-hop" from one shore of the lake to another. The lake is known for its abundant fish population, including whitefish, perch, tullibee, and northern pike.

BACKGROUND

Evidence of prehistoric occupation of Black Fox Island had been previously reported by McCullough (1975, 1977, 1982), the result of an archaeological survey of the Lac La Biche region. McCullough's report of Clearwater Lake Punctate pottery, found at GfPa-32, initiated interest on the part of the author as to how much more pottery was present on the site or the island and what could be inferred from its geographical and archaeological context. McCullough's 1975 survey also indicated the presence of two other prehistoric sites on the island, thus leading to questions as to the complete extent of prehistoric use or occupation of the island.

RESEARCH OBJECTIVES AND PROCEDURE

Objectives and a testing strategy suitable to a preliminary investigation of the island's archaeological resources were agreed upon by the author and Alberta Culture. The objectives included:

a) Evaluation of GfPa-32 archaeological resources and delineation of its boundaries.

b) Collection of samples of prehistoric ceramics from GfPa-32 and environs.

c) Determination of the relationships (if any) between GfPa-32, GfPa-33 and GfPa-8, all previously reported by McCullough (1975).

d) Detection of undiscovered archaeological sites at other locations on Black Fox Island.

The procedures used to attain the above-stated objectives were controlled subsurface testing at GfPa-32 based on a two meter grid established for the site and test pitting at locations on Black Fox Island which had moderate or high potential to yield other prehistoric sites.

GfPa-32

Testing of the site began with an examination of the face of the bluff upon which the site was located. Cultural material was observed in the exposure and provided a reference point from which to delimit the site boundaries. Test pits (0.5 m by 0.5 m) were sunk to the south, west, and north of the bluff edge, which itself delimited the eastern site boundary. After the site boundaries were determined an area on site was cleared and a two meter grid system was established for the site and staked out on the cleared area. A system of 2.0 m by 0.5 m trenches was planned in the site's preliminary excavation strategy and was implemented in four of the grid units. After consultation with E. J. McCullough the author decided to open units at the bluff edge where cultural material, including pottery, was visible so as to attain the research objective of increasing the ceramic sample from the site as no pottery had been found in the test pits or test trenches. Three one meter wide units on the bluff edge did yield pottery.

All units were excavated according to observed natural stratigraphy, which in most cases comprised three discrete levels of humus, A-horizon soils, and a clay subsoil. Where an occupation level or activity area was suspected the materials were mapped as comprising a "cultural level." Trowel and screen were utilized for the artifact bearing humus and A horizon levels, and A horizon/subsoil interface. Shovel shaving and screening were utilized as sterile subsoil was approached. The subsoil was excavated to a level where it could be said without a doubt it was no longer bearing cultural material, usually no deeper than 40 cm.

Other Black Fox Island Sites

While the survey and test pitting strategy for the remainder of Black Fox Island was judgemental, a methodology was devised so as to ensure complete coverage of the island. A system of transects, three in total, aligned on a roughly true north compass bearing allowed a complete visual survey of the island as the transects were walked. Certain points along the transect lines were used as reference stations from which to observe potential sites, and test pits were sunk in the areas of high to moderate potential within each station's designated area. This survey coverage strategy was designed with the understanding that due to considerations of terrain and vegetative cover (fairly heavy bush) it could not be perfectly transposed from paper to field operation but would constitute an approximation of the actual survey plan (Figure 23).

Test pits were 0.5 m by 0.5 m and were excavated to sterile subsoil in all cases. Excavation of the pits proceeded by trowel and shovel, or shovel shaving.

RESULTS OF FIELDWORK

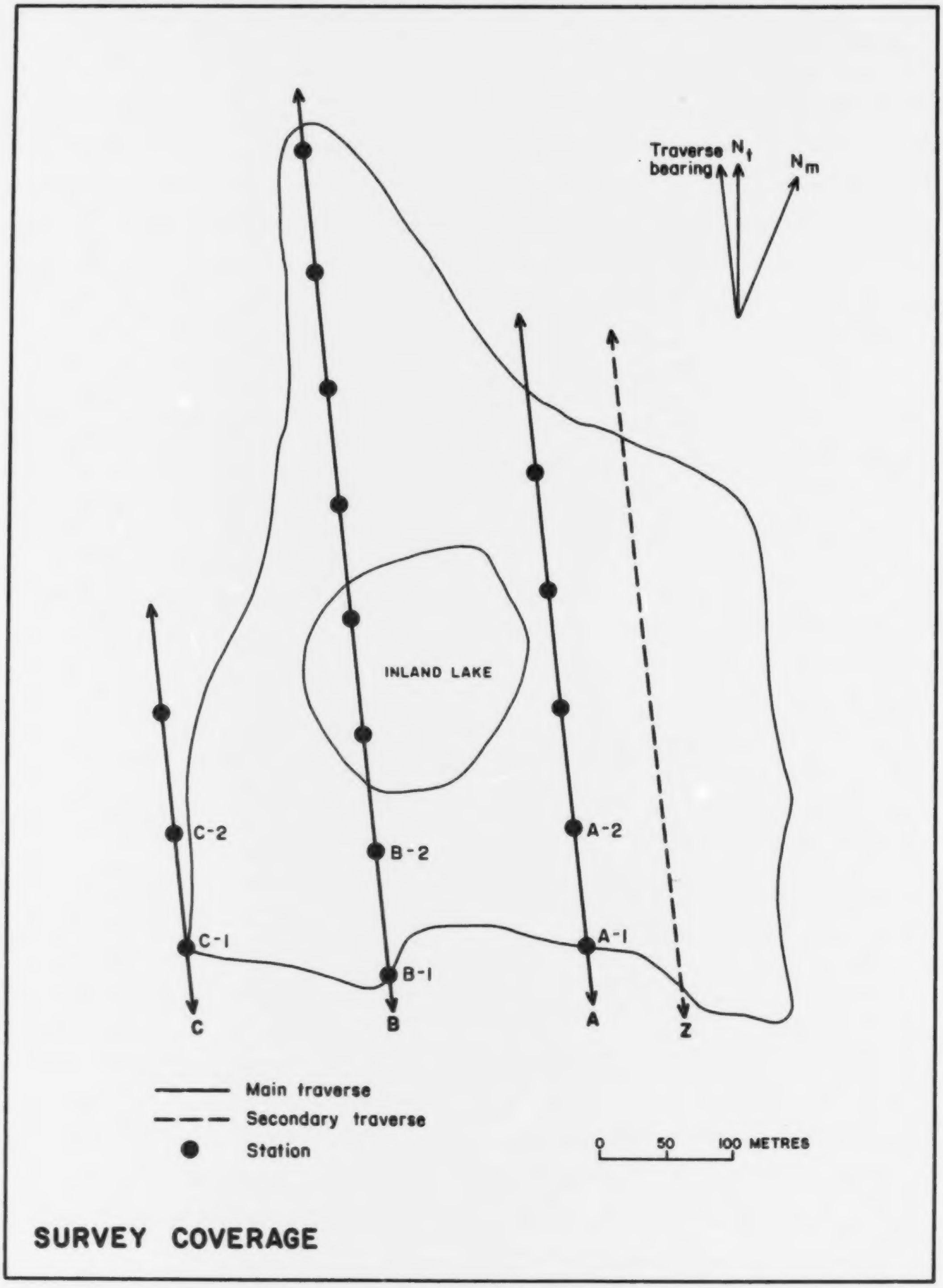
GfPa-32

A total area of 16 m^2 was excavated on GfPa-32. A total of 4697 artifacts were found. Of this total, pottery sherds comprised 9.94% (553 pieces); lithic materials comprised 83.12% (4628 pieces); and bone comprised 6.94% (386 pieces).

Diagnostic artifacts for the site include: one small, white quartzite, corner-notched point; one small, dark brown chert, corner-notched point; one small, corner-notched point of unidentified lithic material (white, grainy lithic with high mica content); two Oxbow-type points of quartzite; one triangular point, with part of the base broken; and a number of ceramic vessel sherds with cord-marked and punctate design (Figure 24 A-I).

Island Survey

A systematic collection of GfPa-33, as recommended by McCullough (1975), was conducted at Locality 2 of the site. The selective collection of Locality 2 yielded a total of 215 pieces of lithic material, mainly quartzite debitage (cores, large and small flakes, shatter). A selective collection of materials at Locality 1 of GfPa-33 yielded four cores of quartzite material.


Traverse bearing
Nt
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INLAND LAKE
C-2
B-2
A-2
C-1
B-1
A-1
C
B
A
Z
Main traverse
Secondary traverse
Station
0 50 100 METRES
SURVEY COVERAGE

Figure 23: Survey strategy for Black Fox Island.

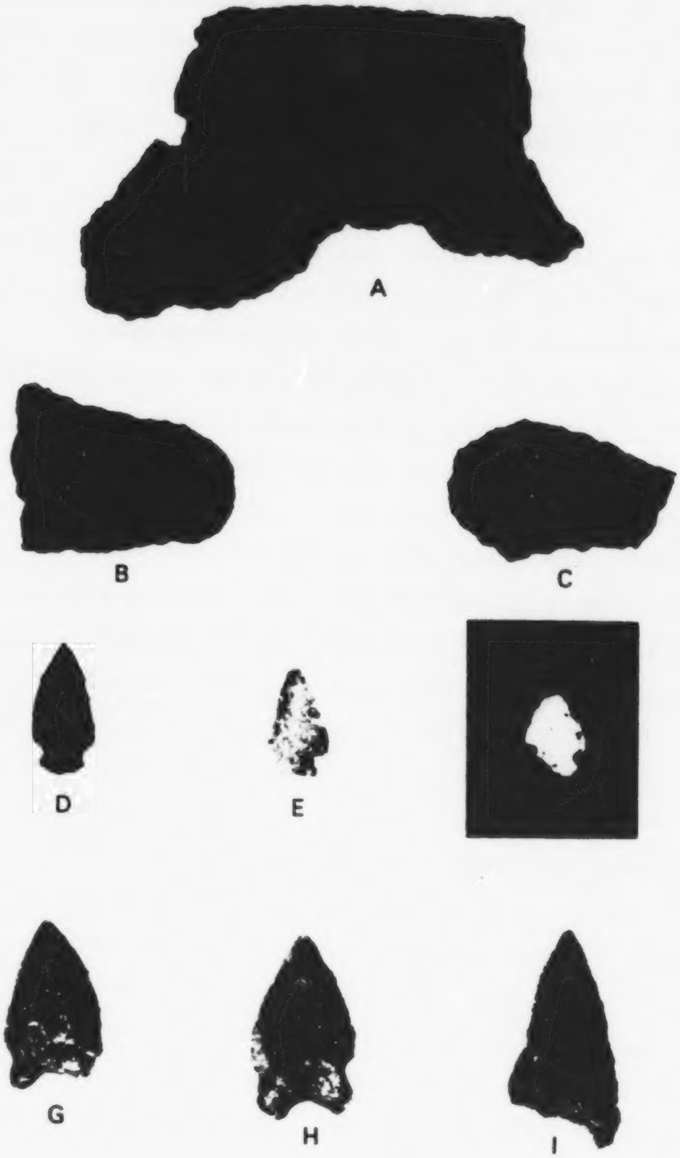


Figure 24: A. Clearwater Lake Punctate type rimsherd; B, C. cord-marked shoulder sherds of pottery vessel(s); D, E, F. corner-notched projectile points; G, H. Oxbow type projectile points; I. triangular projectile point (incomplete).

The yield of materials from test pits excavated to locate new sites on the island totalled 246 artifacts, comprised of mainly lithics, with some bone, and in one instance, pottery (two sherds). A total of fifteen new sites was located and recorded for Black Fox Island.

CONCLUSION

The Black Fox Island Project was successful in its objectives of delimiting GfPa-32, testing the extent of that site's archaeological potential, and increasing the pottery sample from the site. The discovery and identification of previously unknown sites on Black Fox Island completed another of the project's objectives. Future analysis of data will determine the relationships between GfPa-32, GfPa-33, and GfPa-8.

Despite the fact that the ceramics found on GfPa-32 appeared only on or near the bluff edge in one limited location is problematic, there are several non-cultural explanations which may account for this situation: the testing strategy for the site may have inadvertantly missed other locations of ceramics; any other pottery which was on the site at one time may have been lost due to slumping of part of the site on the bluff edge; another erosional agent, through time, may have deposited the pottery in one location from nearby loci. Other culturally oriented explanations will be considered as analysis of the site continues.

The discovery of cord-marked pottery at a location approximately 100 meters from GfPa-32 suggests that the presence of pottery at the site was more than an isolated occurrance on the island. This newly discovered pottery site north of GfPa-32 merits further investigation to discern the relationship between the two pottery yielding sites.

The diagnostic artifacts and their vertical spatial positions on GfPa-32 indicate that the site is stratified and was occupied by at least two cultural entities, one much earlier than the other. The occurrence of Oxbow points and associated quartzite chipping debris leaves no doubt of workshop, and possibly, camping activity by Oxbow peoples. The Oxbow materials were located approximately 15 centimeters below the Clearwater Lake Punctate rims and cord-marked body sherds. The Oxbow points were very close to the bluff edge. Other materials may have slumped down the incline. Tentatively, it seems that other quartzite materials found at a similar stratigraphic level may be attributed to the Oxbow occupation.

The discovery of a number of previously unknown sites throughout the island, both on the shoreline exposures and inland, raises the question of their relationship to one another through time and on a geographical or activity basis. The island seems to have been very intensively utilized by prehistoric peoples.

A topographical map of GfPa-32 and immediate environs is currently being completed. Clay samples were collected for anlaysis of mineral content and to determine general suitability for pottery making. An analysis of faunal remains from GfPa-32 and from the test pitted locations on the island may allow inferences of prehistoric resource use. Several carbon samples were collected at GfPa-32 and will prove useful in providing absolute dates for site occupations. Future analysis of the cultural remains from GfPa-32 and other sites on the island will continue to raise questions and provide answers for Black Fox Island's prehistory.

ACKNOWLEDGEMENTS

Assistance throughout the Black Fox Island endeavor was provided by crew member Morris Maccagno, with shorter-term assistance by crew members John Priegert and B. Muckle, and volunteer assistance from Tom Maccagno and John Learn. Guidance for the project's fieldwork aspect was provided by Edward J. McCullough, who visited the project during the course of excavation. Fieldwork and research has been made possible by funds awarded through a research contract with the Archaeological Survey of Alberta, Alberta Culture. Thanks are extended to Rick Will, Department of Anthropology, University of Alberta, for his photography of the artifacts in Figure 24.

AN INTRODUCTION TO ALBERTA RADIOCARBON DATES

J. Roderick Vickers
Archaeological Survey of Alberta

In 1982, Ethos Consultants Ltd. undertook a compilation of radiocarbon dates from Alberta. The resultant list is published here for the benefit of archaeologists working in the province. This has been done in the full knowledge that the list is incomplete and may contain errors. Researchers noting errors, ommissions, or having recently acquired dates, are requested to write the Plains Archaeologist, Archaeological Survey of Alberta so that the list may be corrected and updated.

Brumley and Rushworth very clearly state that the list is not a primary source. Not only may the list contain errors, but the original associations may be in doubt. It is advised that researchers pursuing specific topics should use the list rather like a bibliography to search for original sources. In this, the compilation will no doubt be of great utility.

Despite the limitations and cautions noted above, it is interesting to examine the cultural chronology represented by the listed dates. To this end, Figures 26-30 were prepared for those dates which are associated with diagnostics. The usual format showing date midpoint and one standard deviation is used. Site numbers and level designations are in the same format as employed by Brumley and Rushworth (this volume). The only variation from standard format is the use of Christian calendar years for the ordinal axis.

Figure 25, however, is intended as a visual summary and was compiled in a rather different manner. In this case, the date midpoint was simply assigned to the appropriate century. Thus, in Figure 25, one notes that there are five Old Woman's Phase dates falling between A.D. 1800-1899, seven dates falling between A.D. 1700-1799, etc.

The date distributions require little discussion except for some general notes. It is obvious from the illustrations where the majority of dates of specific cultural phases occur. Those dates that deviate from the norm are also obvious; one would expect any archaeologist to hesitate before accepting an A.D. 1600 date for a Pelican Lake component, for example (Figure 28). Similarily, when a cluster of dates from several sites falls outside the generally accepted range, such as the Pelican Lake dates in the A.D. 400-850 range, careful consideration should be given to the possibility that traditional chronologies are inadequate (Figure 28). There is no *a priori* reason to assume that components from Alberta will date exactly equivalent to those in other areas. Lastly, it should be obvious that constructs such as "Mummy Cave" require better definition and that the rubric "Paleo-Indian" is useless.

In closing, I would suggest that archaeologists avoid citing corrected dates alone, or provide details of the correction interval used, since a number of scales are available for correcting radiocarbon dates.

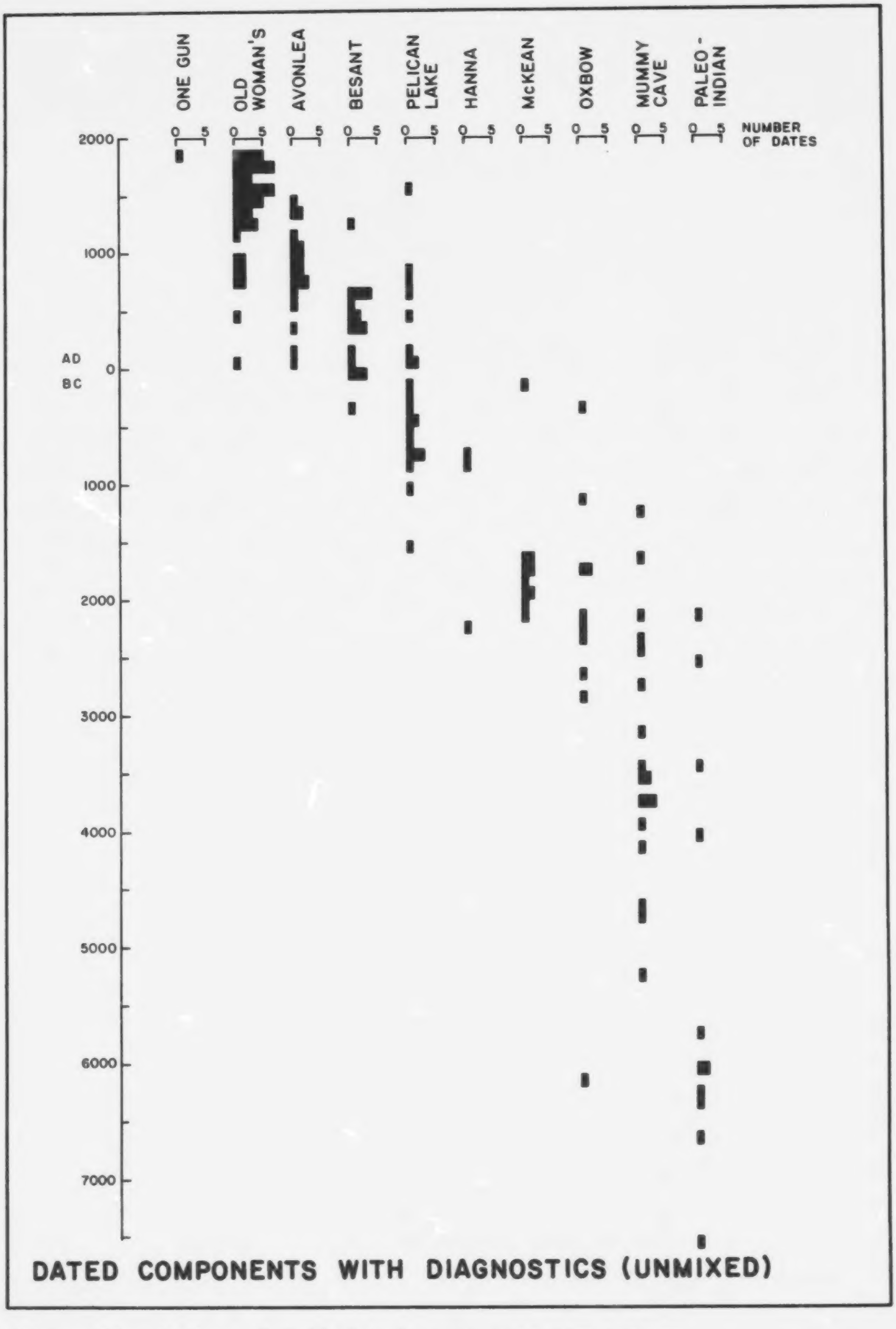


Figure 25: Number of C-14 dated components per century.

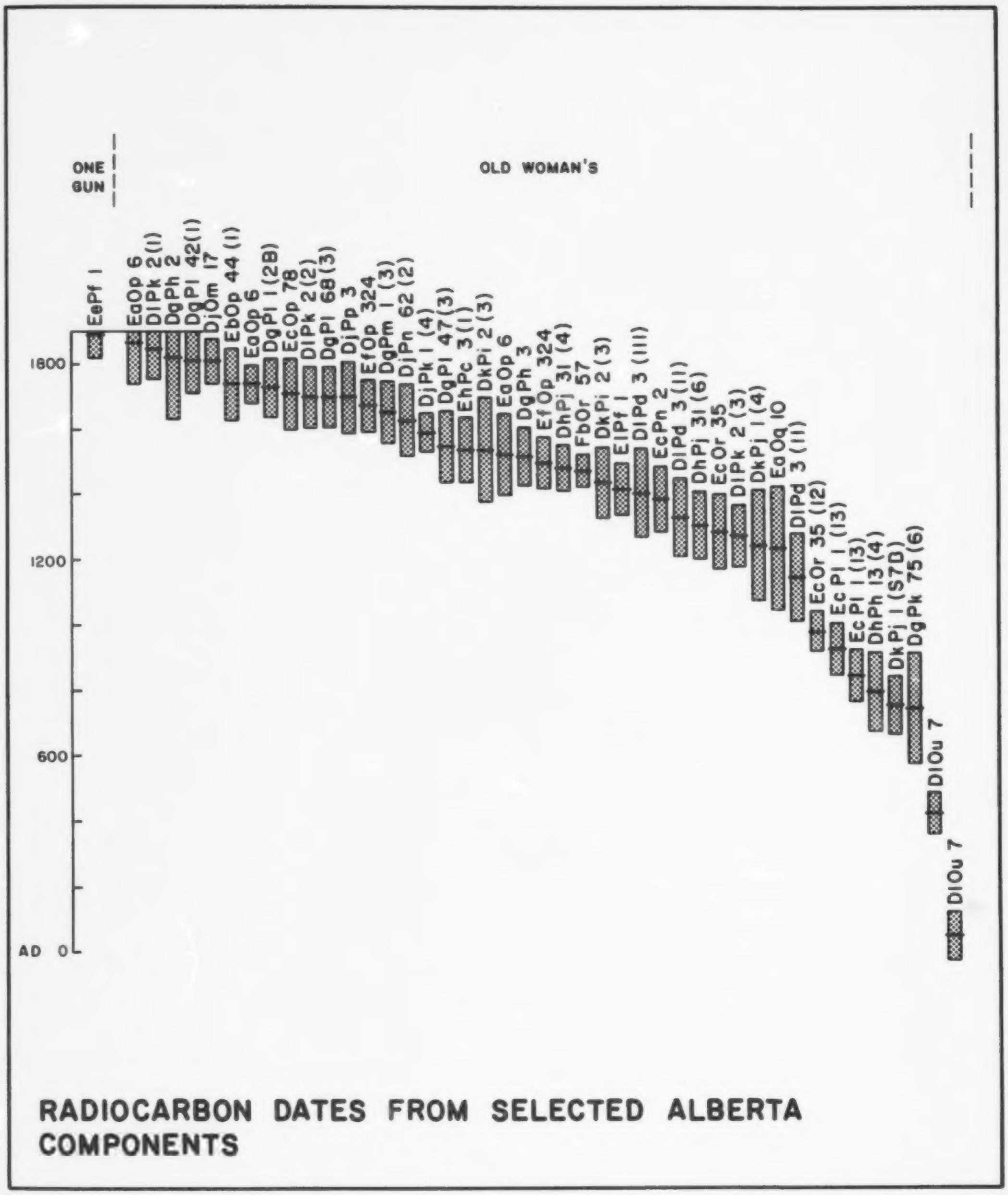
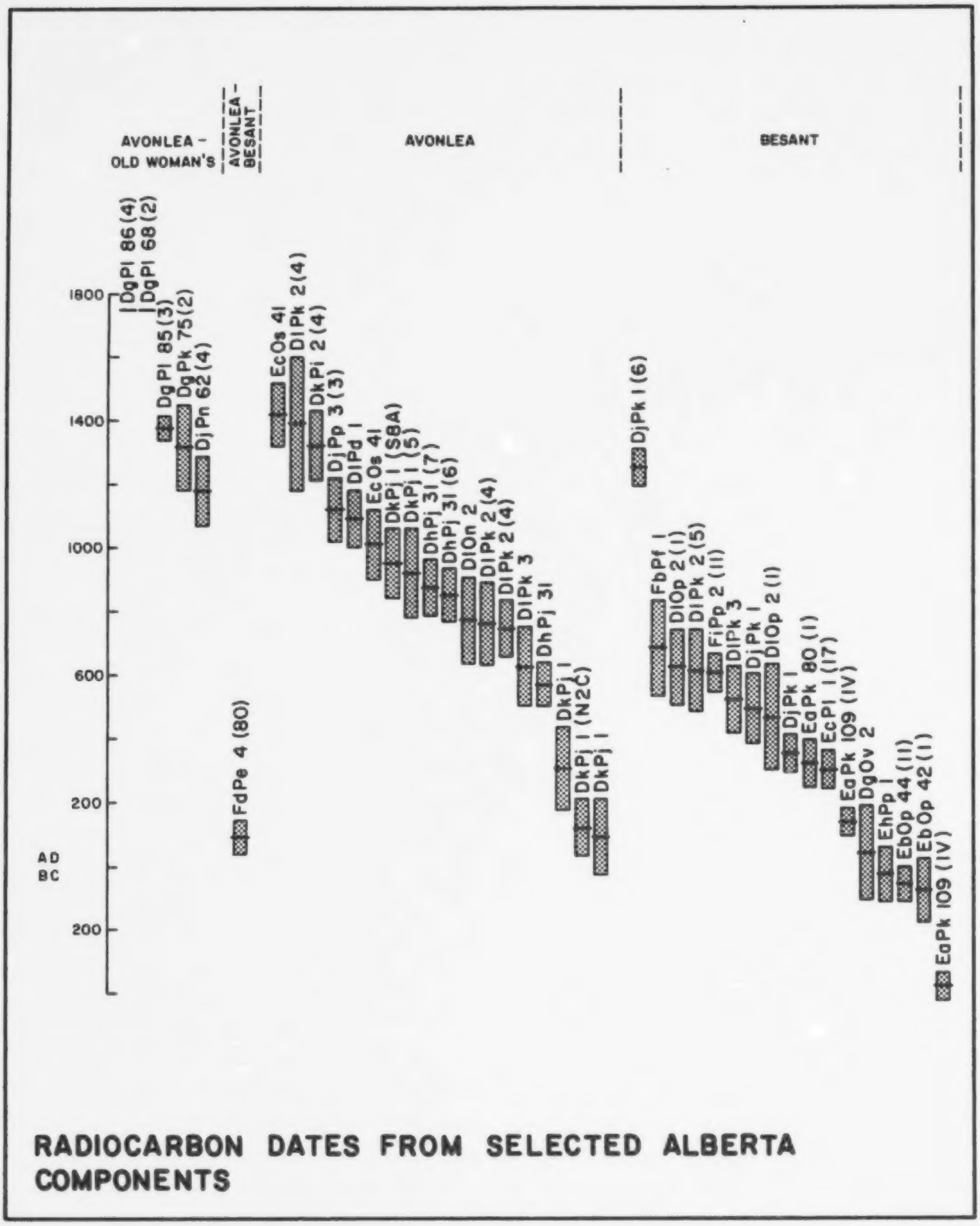
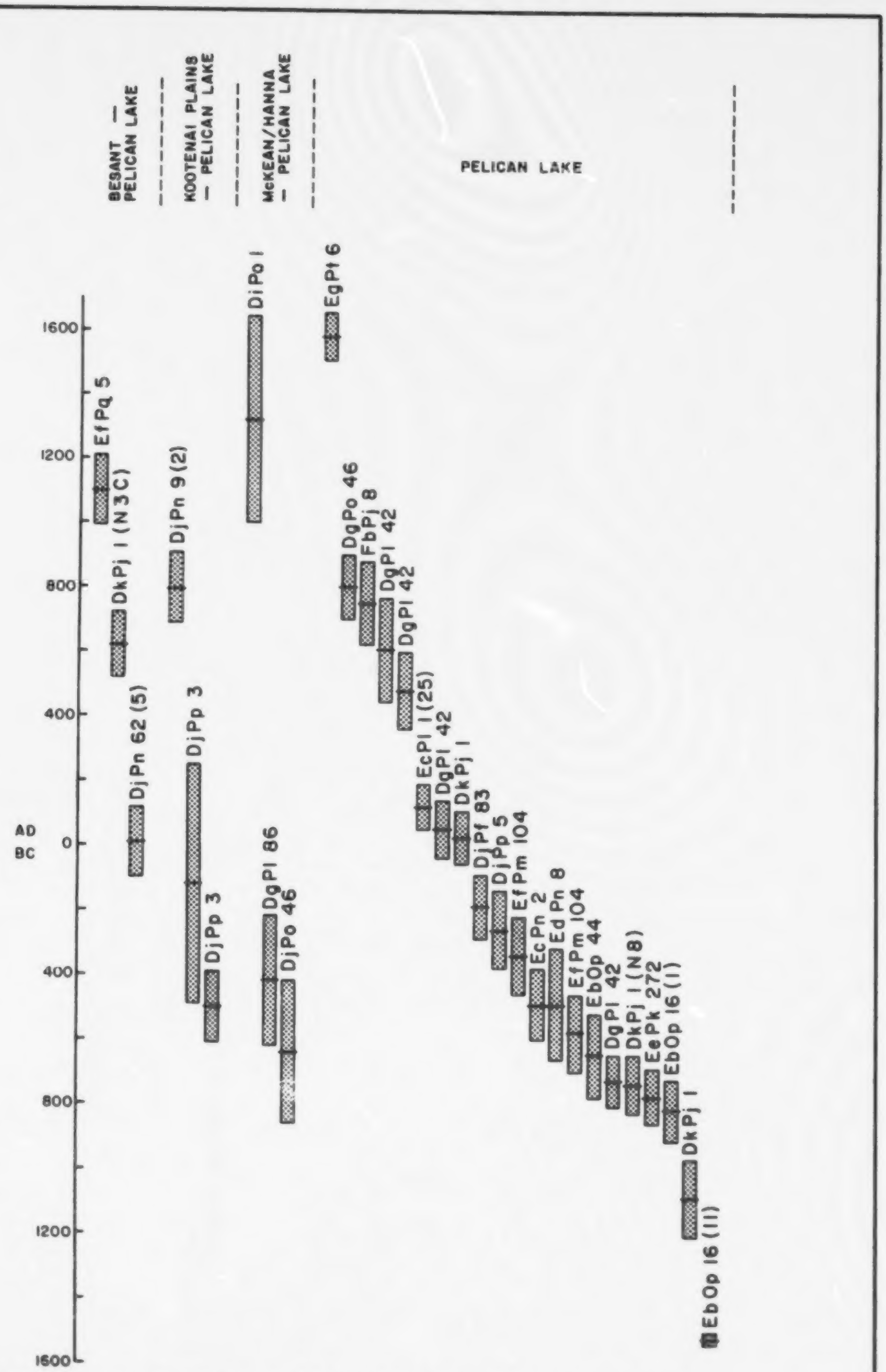


Figure 26: Radiocarbon dates of phase assigned sites (Late Prehistoric).



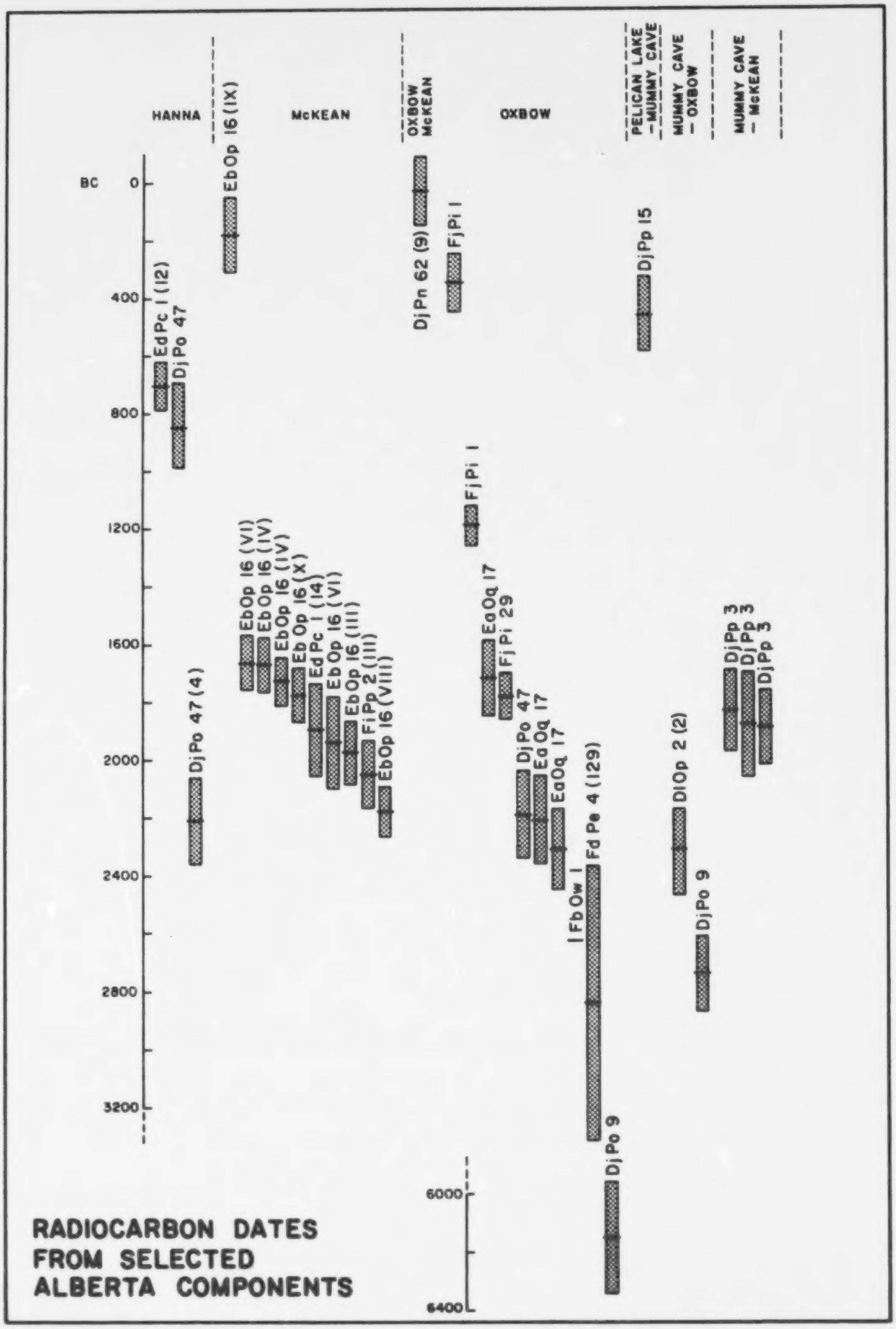
RADIOCARBON DATES FROM SELECTED ALBERTA COMPONENTS

Figure 27: Radiocarbon dates of phase assigned sites (Late and Middle Prehistoric).



RADIOCARBON DATES FROM SELECTED ALBERTA COMPONENTS

Figure 28: Radiocarbon dates of phase assigned sites (Middle Prehistoric).



RADIOCARBON DATES FROM SELECTED ALBERTA COMPONENTS

Figure 29: Radiocarbon dates of phase assigned sites (Middle Prehistoric).

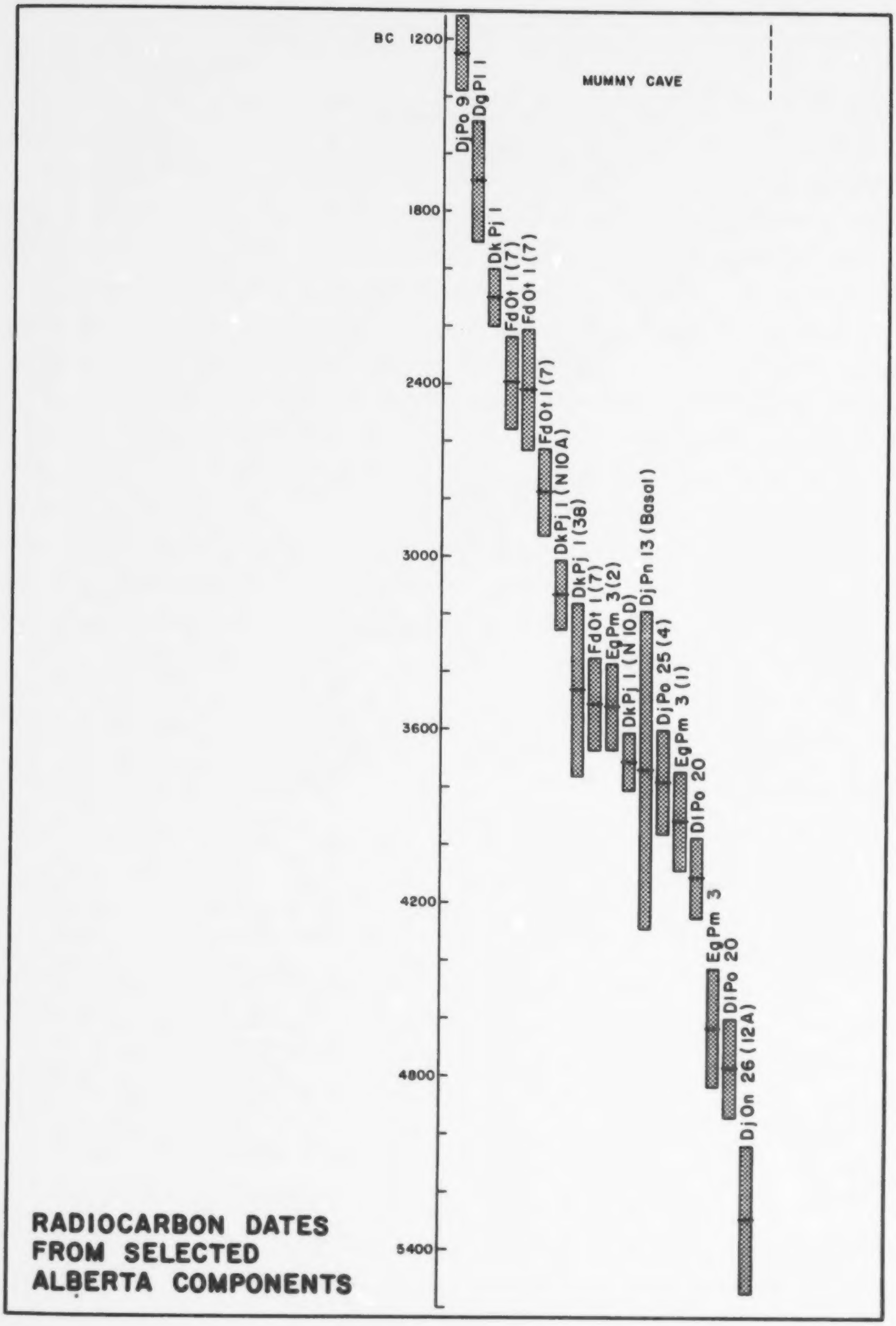


Figure 30: Radiocarbon dates of phase assigned sites (Middle Prehistoric).

A SUMMARY AND APPRAISAL OF ALBERTA RADIOCARBON DATES

John H. Brumley

Carol A. Rushworth

INTRODUCTION

Radiocarbon dating is easily the most important and extensively utilized chronometric dating technique employed by archaeologists in developing and refining temporal models of culture history. However, being aware of and drawing together available radiocarbon dates for a region in order to develop such models is becoming increasingly difficult. The ever-increasing volume of archaeological literature - much of which is unpublished - makes it increasingly difficult for researchers to keep abreast of relevant dates for specific research projects. Also, many dates are never published or are often published at a later date than the report on the site from which they were obtained.

These and other problems severely limit the usefulness of existing dates since many researchers are not aware of many dates and do not have the time to thoroughly review the literature to find even those dates that are published.

With these considerations in mind, the authors have attempted to draw together all presently available radiocarbon dates from the Province of Alberta. These dates are presented in Table 4. Before discussing the manner in which this data was complied and how it is summarized, a number of comments are warranted regarding how the list is intended to be used and how it should not be utilized.

Quite simply, the list is intended as a reference tool and not as a primary data base. Researchers interested in dates relating to a specific area of the province, time interval or cultural complex can utilize it to quickly identify primary data sources where such information is available. Although considerable effort has been expended to insure that data presented is error-free, this should always be verified by reference to original sources. Not only should the value of the date itself be verified by reference to the original source, but an evaluation of its association should be made. In the course of compiling this list the authors came across a number of dates which fall well outside the generally accepted temporal range for cultural materials with which they were associated. Such dates were classed as questionable only if researchers reporting or familiar with the dates so indicated. Several researchers have expressed concern that this list will be employed in a manner for which it was not intended. Undoubtedly it will, but to not produce such an item of general usefulness simply because it may in certain instances be inappropriately utilized seems a defeatist approach.

PROCEDURES EMPLOYED IN COMPILING DATE LIST

The authors initially conducted an extensive but not exhaustive literature search in order to compile a preliminary date list. This initial list was then circulated to all known researchers in the province along with a request to: 1) check for errors in dates presented with which they were familiar, 2) check to see that published dates with which they are familiar were present, and 3) provide information on unpublished dates in their possession or of which they were aware. Response to this request was good. A number of errors and omissions present in the initial list were identified and corrected. In addition, a large number of unpublished dates were submitted and are included.

As finalized and presented here in Table 4, the date list is estimated to comprise at least 80 to 90 percent of all radiocarbon dates available for the province. A few researchers known to have unpublished dates had not responded at the time this list was finalized. In addition, our grasp of literature in other disciplines such as geology and paleontology is limited and as such a number of radiocarbon dates reported there may have been missed.

UPDATING AND CORRECTING THE DATE LIST

Radiocarbon date information presented here has been compiled and stored on a microcomputer data disk which allows considerable flexibility in correcting, adding to, or modifying data categories at any time. It is hoped that the list will be found to be a valuable reference tool and that it can be kept current by periodic updating.

REPORTED DATES

Table 3 summarizes abbreviations and conventions utilized in summarizing radiocarbon dates presented in Table 4. Table 5 summarizes the number of radiocarbon dated sites and the total number of dates from various portions of the province. Table 6 summarizes the association of dates listed.

A brief perusal of Tables 5 and 6 will quickly point out major geographic and cultural complex disparity in the level of radiocarbon dating. Seventy-one percent of listed dates are located in the southern one-third of the province, 20% in the central third of the province, and 9% in the northern third. Sites with one or more radiocarbon dates represent 1.1% of the total number of sites recorded for the province as a whole varying from 0.0 to 6.2% within various major Borden Blocks.

Table 6 summarizes date associations. Again, this table points out the tremendous inadequacy and disparity in distribution of dated materials. Dates with indeterminate cultural or geological association comprise 41% of the sample. This leaves a total of 201 dates as our primary chronometric data base for developing cultural chronologies for the entire province.

Tables 5 and 6 clearly indicate the overall level of radiocarbon sampling from all portions of the province and relating to all cultural associations is clearly minimal and inadequate. Future budgeting and research emphasis should be placed on remedying this situation.

ACKNOWLEDGEMENTS

The authors would like to thank those researchers who responded in such short notice, to our request for corrections and additional data.

Overall supervision of the project was conducted by John Brumley with Carol Rushworth and Barry Dau performing the search for published dates. Carol also entered the information into the microcomputer. Donna Thane typed the report, with the exception of Table 4.

Table 3: Summary of Abbreviations and Conventions Utilized in Table 4

DATA CATEGORY	DEFINITION
Site #	This is the Borden designation for the site from which the dated material was recovered. "IND" indicates that the Borden number was not noted in the reference cited.
Site Name	If the site was given a name it is noted here. If no name was given or is known, no entry was made.
Lab Number	This is the sample number assigned by the laboratory that conducted the dating procedure.
Reference(s)	This entry gives the source or sources for the radiocarbon date and other references to the site. Those references given as only a name are personal communications. Numbers in brackets refer to A.S.A. project number.
Material	This is a two-letter code for the dated material, together with a one-letter code for the condition of that material. "IND" means the material was not reported. AP = apatite BO = bone CH = charcoal CO = bone collagen HA = humic acid SO = soil WO = wood OR = combined sample of organic material PE = peat /B = burned /C = charred /L = calcined /A = acid treatment e.g. BO/B = burned bone WO/C = charred wood
Level	This referes to the vertical provenience of the dated material. A Roman numeral indicates that the reference referred to the level as an occupation. Other types of levels are given as stated in the reference. The entry "NA" means that level was not mentioned or not defined. Numbers given in brackets indicates depth in centimeters below surface.

Table 3: Continued

DATA CATEGORY	DEFINITION
Association	This is a two-letter code for the cultural association of the dated material as reported in the reference cited or inferred from the diagnostic material recovered. The cultural units generally follow Reeves (1969). A question mark (?) indicates that the association is tentative or questionable; diagnostic material may not have been in direct association with the dated material or no diagnostic material was recovered and the association was made intuitively. "IND" means no cultural assignment was made, "GEO" indicates a geological date. Following is a list of the codes and their definitions. AV = Avonlea BE = Besant BR = Bitterroot HA = Hanna KP = Kootenay Plains MC = Mummy Cave MK = McKean OW = Old Women's OX = Oxbow PA = Pre-Archaic PI = Paleo-Indian PL = Pelican Lake SR = Salmon River More than one code in a single entry indicates a mixture of diagnostic material or a transitional phase.
BP	This entry gives the radiocarbon date expressed in years before the A.D. 1950 base date.
CE	This is the Christian dating equivalent of the B.P. date. The plus sign (+) indicates A.D., the minus sign (-) indicates B.C.
SD	This is the standard deviation of the above date. "IND" means it was not stated in the reference cited.

Table 4: Summary of Alberta Radiocarbon Dates

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
DgOv-12	MANY SNAKES BURIAL S-2092 BALDWIN PERSONAL COMMUNICATION; GETTY 1971	BO	IND	NA	685	60	+1265
DgOv-2	S-1403 BRINK 1979:26-27	CO	BE	NA	1910	150	+40
DgOv-93	S-1404 BRINK 1979:18	CO	IND	NA	2675	145	-725
DgOv-94	S-1458 BRINK 1979:42	BO	IND	NA	575	165	+1375
IND	DEL BONITA GX-1770 REEVES 1973 FROM WILSON 1971	BO	GEO	NA	4270	130	-2320
DgPh-2	S-844 QUIGG PERSONAL COMMUNICATION	BO	OW	NA	130	185	+1920
DgPh-3	POINT BLAZER S-828 QUIGG 1975A:61	CH	OW	IND	430	90	+1520
DgPk-75	S-723 WILMETH 1978:97	CH	AV - OW	2	630	135	+1320
DgPk-75	S-724 WILMETH 1978:97	CH	OW	6	1200	170	+750
DgPl-1	GX-1460 DAVIS 1972; REEVES 1972:324	AP	MC	NA	3645	210	-1695
DgPl-1	GX-2016 REEVES 1972:324	IND	OW	2B	220	90	+1730
DgPl-4	NARROWS GX-2011 DAVIS 1972:219	IND	IND	NA	2345	160	-395
DgPl-4	NARROWS GX-2013 DAVIS 1972:219	IND	IND	NA	1460	120	+490
DgPl-4	NARROWS GX-1459 MILNE-BRUMLEY 1971	CO	? MC	NA	4930	160	-2980
DgPl-4	NARROWS GX-2012 DAVIS 1972:219	IND	IND	NA	4390	220	-2440
DgPl-4	NARROWS GX-2010 DAVIS 1972:219	IND	IND	NA	2135	90	-185
DgPl-42	GX-2049 DAVIS 1972; REEVES 1972:324	CO	PL	NA	1470	120	+480
DgPl-42	GX-2050 REEVES 1972:324	IND	PL	NA	1900	90	+50
DgPl-42	GX-1196 REEVES 1970:253	CH	PL	NA	2680	80	-730
DgPl-42	GX-2014 DAVIS 1972 II:218; REEVES 1972:324	IND	OW	1	135	100	+1815
DgPl-42	GX-1272 REEVES 1970:253	CO	PL	NA	1345	160	+605
DgPl-47	GX-2048 REEVES 1972:324	CO	OW	3	400	110	+1550
DgPl-68	GX-2051 REEVES 1972:324	CO	OW	3	250	95	+1700
DgPl-68	GX-2052 DAVIS 1972:220; REEVES 1972:324	CO	AV - OW	2	200	IND	+1750
DgPl-85	GX-2194 REEVES 1972:324	CO	AV - OW	3	570	40	+1380
DgPl-86	GX-2046 REEVES 1972:324	CO	MK - PL	NA	2370	100	-420
DgPl-86	GX-2045 REEVES 1972:324	IND	AV - OW	4	200	IND	+1750
DgPm-1	GX-1435 REEVES 1972; REEVES 1973:1235	CH	PI	NA	8200	240	-6250
DgPm-1	GX-2044 REEVES 1972:324	CO	OW	3	295	95	+1655
DhPh-13	S-829 QUIGG 1975A:61; WILMETH 1978:97	CH	OW	4	1150	120	+800
DhPj-31	MANYFINGERS S-947 QUIGG PERSONAL COMMUNICATION	BO	OW	4	465	70	+1485
DhPj-31	MANYFINGERS S-864 QUIGG PERSONAL COMMUNICATION	CH	OW	6	640	105	+1310

Table 4: Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
DhPj-31	MANYFINGERS S-722 QUIGG PERSONAL COMMUNICATION	BO	AV	IND	1380	70	+570
DhPj-31	MANYFINGERS S-866 QUIGG PERSONAL COMMUNICATION	BO	AV	7	1075	90	+875
DhPj-31	MANYFINGERS S-865 QUIGG PERSONAL COMMUNICATION	BO	AV	6	1100	85	+850
DhPs-5	GX-6392-A LIFEWAYS - UNPUBLISHED DATE	BO	IND	NA	3680	220	+1730
DiPj-3	LAYTON GX-1023 DAVIS 1972:223	IND	? MK	NA	4150	105	-2200
DiPo-1	RL-1476 QUIGG 1981B:34	BO/L	MK - PL	NA	630	320	+1320
DjOm-17	SOUTH BATTLE CREEK GAK-1269 WILMETH 1978:95	CH	OW	NA	140	70	+1810
DjOm-18	EAST BATTLE CREEK GAK-2334 WILMETH 1978:88	CH	IND	NA	7300	150	-5350
DjOn-10	KAJEWSKI GAK-1272 WILMETH 1978:91	BO/C	IND	NA	3100	80	-1150
DjOn-26	STAMPEDE S-731 GRYBA 1975:157; WILMETH 1978:96	BO/C	BR	12A	7245	255	-5295
DjOn-8	ELKWATER LAKE GAK-1273 WILMETH 1978:89	SO/B, CH	IND	NA	1260	100	+690
DjOw-1	FLETCHER S-1081 QUIGG 1976:108	BO	IND	8	1675	145	+275
DjOw-1	FLETCHER S-1083 QUIGG 1976:108	BO	PI	11	4130	115	-2180
DjOw-1	FLETCHER S-1082 QUIGG 1976:108	BO	PI	9	4470	120	-2520
DjOw-1	FLETCHER S-1084 QUIGG 1976:108	BO	PI	12	7655	110	-5705
DjOw-1	FLETCHER RL-560 QUIGG PERSONAL COMMUNICATION	BO	PI	11	5960	170	-4010
DjPf-83	RL-1408 RONAGHAN PERSONAL COMMUNICATION (80-71)	CO	PL	NA	2140	100	-190
DjPk-1	KENNEY S-270 WILMETH 1978:91	CH	OW	4	355	60	+1595
DjPk-1	KENNEY S-272 REEVES 1970:257 FROM MCCALLUM AND WITTENBURG 1968	CH	BE	NA	1600	60	+350
DjPk-1	KENNEY GAK-1354 REEVES 1970:257	BO	BE	NA	1460	110	+490
DjPk-1	KENNEY S-271 REEVES 1970:257	IND	BE	6	700	60	+1250
DjPn-13	GX-6383 REEVES 1974B, 1974C	CH	MC	BASAL	5685	550	-3735
DjPn-62	S.S. BURMIS RL-434 QUIGG 1975B	BO	BE - PL	5	1940	110	+10
DjPn-62	S.S. BURMIS RL-433 QUIGG 1975B	BO	OX - MK	9	1980	120	-30
DjPn-62	S.S. BURMIS RL-436 QUIGG 1975B UNPUBLISHED	BO	OW	2	320	110	+1630
DjPn-62	S.S. BURMIS RL-435 QUIGG 1975B	BO	AV - OW	4	770	110	+1180
DjPn-9	RL-420 QUIGG AND REEVES 1975:12	BO	IND	1	3100	30	-1150
DjPn-9	RL-421 QUIGG AND REEVES 1975:12	BO	IND	1	2860	130	-910
DjPn-9	RL-418 QUIGG AND REEVES 1975	BO	KP	1	<450	IND	IND
DjPn-9	RL-419 QUIGG AND REEVES 1975:13	BO	? KP - PL	2	1150	110	+800
DjPo-25	BILL WHITE IND REEVES AND KENNEDY 1980 PERSONAL COMMUNICATION	CO	MC	4	5730	180	-3780
DjPo-46	RL-770 DRIVER 1978:106	IND	HA - PL	NA	2590	120	-640

Table 4: Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE	SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
DjPo-46	RL-771 DRIVER 1978:102	IND	IND	NA	2760	120	-810	DjPo-9	RL-507 DRIVER 1978:100 FROM CALDER ET AL 1977	IND	BR - OX	NA	4690	130	-2740
DjPo-46	RL-769 DRIVER 1978:106	IND	PL	NA	1150	100	+800	DjPp-100	EAGLE CAVE GSC-1085 WILMETH 1978:88	WO/C	IND	NA	130	130	+1820
DjPo-47	GX-6384-A REEVES AND DRIVER 1978	BO-AP	NA	4	4160	150	-2210	DjPp-100	EAGLE CAVE GAK-2336 WILMETH 1978:88	BO	IND	NA	22700	1000	-20750
DjPo-47	RL-876 REEVES PERS COMM 1979; DRIVER 1978B	BO	IND	NA	7200	230	-5250	DjPp-15	RL-868 REEVES 1974B; REEVES PERS COMM 1979	BO	PL - BR	NA	2410	130	-460
DjPo-47	RL-872 REEVES PERSONAL COMMUNICATION 1979	BO	NA	NA	2800	140	-850	DjPp-3	RL-363 DRIVER 1978:102	IND	BR-SR-MK	NA	3780	140	-1830
DjPo-47	RL-508 DRIVER 1978:100 FROM CALDER ET AL 1977	BO	IND	NA	6340	160	-4390	DjPp-3	RL-367 DRIVER 1978:102	IND	BR-SR-MK	NA	3830	140	-1880
DjPo-47	RL-873 DRIVER 1978B	BO	PI	NA	8550	270	-6600	DjPp-3	RL-366 DRIVER 1978:102	IND	BR-SR-MK	NA	3840	130	-1890
DjPo-47	RL-877 REEVES PERS COMM 1979; DRIVER 1978B	BO	OX	NA	4140	150	-2190	DjPp-3	RL-362 DRIVER 1978:98	SO/D	PI	NA	14470	610	-12520
DjPo-78	RL-512 DRIVER 1978:107	BO	IND	NA	1520	100	+430	DjPp-3	RL-399 DRIVER 1978:98	SO/D	PI	NA	5360	160	-3410
DjPo-81	RL-447 DRIVER 1978:101	BO	IND	NA	6230	180	-4280	DjPp-3	RL-359 DRIVER 1978:108 FROM REEVES 1974	IND	OW	NA	4380	IND	IND
DjPo-81	IND REEVES 1974A	BO	IND	NA	9860	320	-7910	DjPp-3	RL-360 DRIVER 1978:108 FROM REEVES 1974	IND	OW	NA	250	110	+1700
DjPo-81	RL-448 DRIVER 1978:98	BO/B	PI	NA	8020	200	-6070	DjPp-3	RL-401 QUIGG AND REEVES 1975:12 FROM REEVES 1974	IND	KP - PL	NA	2450	100	-500
DjPo-81	RL-517 DRIVER 1978:101	BO	IND	NA	6230	160	-4280	DjPp-3	RL-400 QUIGG AND REEVES 1975:12 FROM REEVES 1974	IND	KP	3	3070	100	-1120
DjPo-81	RL-510 DRIVER 1978:101	BO	IND	NA	6610	160	-4660	DjPp-3	RL-361 QUIGG AND REEVES 1975:12 FROM REEVES 1974	IND	KP - PL	NA	2070	370	-120
DjPo-9	RL-773 DRIVER 1978:102	IND	BR	NA	3200	130	-1250	DjPp-5	RL-867 REEVES 1974B; REEVES PERS COMM 1979	BO	PL	NA	2210	120	-260
DjPo-9	RL-774 DRIVER 1978:100 FROM CALDER ET AL 1977	IND	OX	NA	8100	190	-6150	DjPq-1	GX-6388 KENNEDY 1982 PERSONAL COMMUNICATION	BO	IND	12	5575	185	-3625

Table 4. Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
DjPq-1	GX-6385-A KENNEDY 1982 PERSONAL COMMUNICATION	BO	IND	4	2405	150	-455
DjPq-1	GX-6390-A KENNEDY 1982 PERSONAL COMMUNICATION	BO	IND	(74-94)	4840	165	-2890
DjPq-1	GX-6387 KENNEDY 1982 PERSONAL COMMUNICATION	CH	IND	10	3510	185	-1560
DjPq-2	RL-1556 RONAGHAN ET AL 1982	BO	IND	NA	2650	120	-700
DjPq-2	RL-1557 RONAGHAN ET AL 1982	BO	IND	NA	340	110	+1610
DjPq-2	GX-6391-A RONAGHAN ET AL 1982	BO	IND	(30-40)	4425	140	-2475
DkPb-2	BAYROCK S-68 WORMINGTON AND FORBIS 1965:117	WO	GEO	NA	11090	250	-9050
DkPi-2	RL-1507 LOVESETH ET AL 1980 (80-53)	CH	OW	3	410	160	+1540
DkPi-2	RL-1508 LOVESETH ET AL 1980 (80-53)	CH	OW	3	510	110	+1440
DkPi-2	RL-1509 VAN DYKE PERSONAL COMMUNICATION 1982	CH	AV	4	630	110	+1320
DkPj-1	HEAD-SMASHED-IN RL-334 REEVES 1978:162	BO	MC	N10D	5660	100	-3710
DkPj-1	HEAD-SMASHED-IN GAK-1475 REEVES 1970:260; REEVES 1978:162	BO	AV	NA	1860	120	+90
DkPj-1	HEAD-SMASHED-IN RL-332 REEVES 1978:162	BO/C	PL	N8	2690	90	-740
DkPj-1	HEAD-SMASHED-IN GX-1253 REEVES 1970:253	CO	PL (MO)	NA	1925	80	+25
DkPj-1	HEAD-SMASHED-IN GX-1252 REEVES 1970:260; REEVES 1978:162	CO	AV	NA	1645	130	+305
DkPj-1	HEAD-SMASHED-IN GAK-1474 REEVES 1978:162; WILMETH 1978:90	BO	PL	NA	3040	120	-1090
DkPj-1	HEAD-SMASHED-IN GX-1251 REEVES 1970:260; REEVES 1978:162	IND	? AV	NA	1330	85	+620
DkPj-1	HEAD-SMASHED-IN RL-330 REEVES 1978:162	BO	AV	N2C	1840	90	+110
DkPj-1	HEAD-SMASHED-IN RL-256 REEVES 1978:162	BO	AV	S8A	1000	110	+950
DkPj-1	HEAD-SMASHED-IN RL-257 REEVES 1978:162	BO/C	OW	S7B	1190	90	+760
DkPj-1	HEAD-SMASHED-IN RL-331 REEVES 1978:162	BO	BE - PL	N3C	1330	100	+620
DkPj-1	HEAD-SMASHED-IN GSC-992 REEVES 1978:162; WILMETH 1978:90	BO/B	OW	4	700	170	+1250
DkPj-1	HEAD-SMASHED-IN GX-1220 REEVES 1970:257; REEVES 1978:162	CO	? BE - PL	NA	1460	90	+490
DkPj-1	HEAD-SMASHED-IN GAK-1476 REEVES 1978:162; WILMETH 1978:90	BO	MC	NA	4050	100	-2100
DkPj-1	HEAD-SMASHED-IN RL-333 REEVES 1978:162	BO	MC	N10A	5080	120	-3130
DkPj-1	HEAD-SMASHED-IN GSC-983 REEVES 1978:162; WILMETH 1978:90	BO/B	AV	5	1040	140	+910
DkPj-1	HEAD-SMASHED-IN GSC-803 REEVES 1978:162; WILMETH 1978:90	BO	MC	38	5410	300	-3460
DkPj-1	HEAD-SMASHED-IN GX-1399 REEVES 1970:260; REEVES 1978:162	CO	? AV	2	1335	90	+615
DlOn-2	ROSS CREEK GSC-1296 WILMETH 1978:93	CH	AV	NA	1180	140	+770
DlOp-2	ROSS GLEN GX-5892G QUIGG PERSONAL COMMUNICATION	BO	BE	1	1330	160	+620
DlOp-2	ROSS GLEN GX-5892A QUIGG PERSONAL COMMUNICATION	BO	BE	1	1485	165	+465
DlOp-2	ROSS GLEN RL-1585 QUIGG PERSONAL COMMUNICATION	BO/L	OX - MC	2	4260	140	-2310

SITE #	SITE NAME SITE NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE	SITE .	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
DlOw-7	WALLWORK S-1771 BRUMLEY UNPUBLISHED	CH	OW	NA	1525	60	+425	DlPk-2	HORKIN GX-2057 BYRNE 1973:253	BO	AV	4	1205	90	+745
DlOw-7	WALLWORK S-7 BRUMLEY UNPUBLISHED	CH	OW	NA	1895	75	+55	DlPk-2	HORKIN GX-2060 BYRNE 1973:253	BO	? OW	3	700	90	+1250
DlPa-4	TABER CHILD * IND MUSEUM OF MAN AND UNIVERSITY OF CALGARY 1982	BO	IND	NA	3680	430	-1730	DlPk-3	GX-1190 REEVES 1970:259	CO	AV	NA	1325	120	+625
DlPa-4	TABER CHILD GSC-3 TAYLICH AND BAYROCK 1966:988	WO	GEO	NA	10500	200	-8550	DlPk-3	GX-1189 REEVES 1970:257	CO	BE	NA	1430	105	+520
DlPd-1	UPPER KILL GX-2295 BYRNE 1973	BO/C	AV	NA	855	90	+1095	DlPo-20	GSC-1158 REEVES AND DORMAAR 1972; WILMETH 1978:98	CH	PI	NA	8000	150	-6050
DlPd-3	ROSS S-2042 VICKERS PERSONAL COMMUNICATION; FORBIS 1960	CH	OW	III	15357	190	+415	DlPo-20	GSC-1298 REEVES AND DORMAAR 1972; WILMETH 1978:98	CH	MC	NA	6720	170	-4770
DlPd-3	ROSS S-2039 VICKERS PERSONAL COMMUNICATION; FORBIS 1960	CH	OW	II	615	120	+1335	DlPo-20	GSC-1255 REEVES AND DORMAAR 1972; WILMETH 1978:98	CH	MC	NA	6060	140	-4110
DlPd-3	ROSS S-2041 VICKERS PERSONAL COMMUNICATION; FORBIS 1960	CH	OW	II	800	135	+1150	DlPo-20	GX-956 REEVES AND DORMAAR 1972; WILMETH 1978:98	BO/B	PI	NA	9520	240	-7570
DlPd-3	ROSS S-2038 VICKERS PERSONAL COMMUNICATION; FORBIS 1960	CH	OW	III	540	135	+1410	EaOp-4	STAMPEDE CAMP S-826 WILMETH 1978:95	CH	IND	NA	3690	95	-1740
DlPk-2	HORKIN GX-2294 BYRNE 1973:253	BO	AV	4	1190	130	+760	EaOp-6	SAAMIS S-824 MILNE-BRUMLEY 1978	BO	OW	NA	425	125	+1525
DlPk-2	HORKIN GX-2058 BYRNE 1973:253	BO	AV	4	560	210	+1390	EaOp-6	SAAMIS S-827 MILNE-BRUMLEY 1978	CH	OW	NA	210	80	+1740
DlPk-2	HORKIN GX-2055 BYRNE 1973:253	BO	OW	2	250	95	+1700	EaOp-6	SAAMIS S-825 MILNE-BRUMLEY 1978	BO	OW	NA	85	125	+1865
DlPk-2	HORKIN GX-1191 BYRNE 1973:253	CH	OW	3	670	95	+1280	EaOq-10	RL-1388 QUIGG 1980b:79	BO	OW	NA	710	150	+1240
DlPk-2	HORKIN GX-2296 BYRNE 1973:253	BO	BE	5	1340	130	+610	EaOq-17	SOUTHRIDGE - SUB AREA B RL-1536 BRUMLEY 1981	BO	OX	NA	3670	130	-1720
DlPk-2	HORKIN GX-2054 BYRNE 1973:253	CH	OW	1	105	90	+1845	EaOq-17	SOUTHRIDGE - SUB AREA B RL-1535 BRUMLEY 1981	BO	OX	NA	4260	140	-2310
DlPk-2	HORKIN GX-2056 BYRNE 1973:253	BO	? OW	3	795	85	+1155	EaOq-17	SOUTHRIDGE - SUB AREA B RL-1534 BRUMLEY 1981	BO	OX	NA	4160	150	-2210

* data obtained using "a new accelerator technique"

Table 4: Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
IND	LINDOE GAK-5097 BRYAN 1980:98	BO	PI	NA	9710	190	-7760
IND	LINDOE S-230 BRYAN 1980:98	PE	PI	NA	9900	120	-7950
EaPk-109	S-1704 QUIGG 1981A:60	BO	BE	IV	2330	45	-380
EaPk-109	S-1703 QUIGG 1981A:60	BO	BE	IV	1815	45	+135
EaPk-80	S-1702 QUIGG PERSONAL COMMUNICATION	CH	BE	I	1630	75	+320
EbOp-16	CACTUS FLOWER S-822 BRUMLEY 1975:111	CH	MK	IV	3620	95	-1670
EbOp-16	CACTUS FLOWER S-820 BRUMLEY 1975:111	BO	MK	VI	3890	160	-1940
EbOp-16	CACTUS FLOWER S-1013 BRUMLEY UNPUBLISHED	CH	MK	III	3925	110	-1975
EbOp-16	CACTUS FLOWER S-1012 BRUMLEY UNPUBLISHED	BO	PL	II	3475	20	-1525
EbOp-16	CACTUS FLOWER S-821 BRUMLEY 1975:111	CH	MK	X	3725	95	-1775
EbOp-16	CACTUS FLOWER S-783 BRUMLEY 1975:111	CH	MK	IX	21307	130	-180
EbOp-16	CACTUS FLOWER S-782 BRUMLEY 1975:111	CH	MK	VIII	4130	85	-2180
EbOp-16	CACTUS FLOWER S-1011 BRUMLEY UNPUBLISHED	BO	PL	I	2770	95	-820
EbOp-16	CACTUS FLOWER S-784 BRUMLEY 1975:111	BO	MK	IV	3675	80	-1725
EbOp-16	CACTUS FLOWER S-823 BRUMLEY 1975:111	CH	MK	VI	3615	95	-1665
EbOp-42	S-1212 BRUMLEY UNPUBLISHED	BO	BE	I	2030	100	-80

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
EbOp-44	S-1213 BRUMLEY UNPUBLISHED	BO	BE	II	2010	55	-60
EbOp-44	S-1214 QUIGG 1981B:60	BO	OW	I	210	110	+1740
EbOp-44	RL-1295 BRUMLEY UNPUBLISHED	BO	PL	NA	2600	130	-659
EcOp-78	RL-1128 BRUMLEY ET AL 1981	BO	OW	NA	240	110	+1710
EcOp-78	RL-1127 BRUMLEY ET AL 1981	BO	IND	NA	0	0	+1950
EcOr-34	SEE-EVERYWHERE S-1014 BRUMLEY 1973; WILMETH 1978	BO	IND	NA	160	60	+1790
EcOr-35	RAMILLIES S-1016 BRUMLEY UNPUBLISHED; BRUMLEY AND SAYLOR 1979	BO	OW	NA	660	115	+1290
EcOr-35	RAMILLIES S-1015 BRUMLEY UNPUBLISHED; BRUMLEY AND SAYLOR 1979	BO	OW	12	965	65	+985
EcOs-41	RL-1126 BRUMLEY ET AL 1981	BO	AV	NA	530	100	+1420
EcOs-41	RL-1125 BRUMLEY ET AL 1981	BO	AV	NA	940	110	+1010
EcPl-1	OLD WOMEN'S S-87 FORBIS 1962:81	CH	OW	13	1100	80	+850
EcPl-1	OLD WOMEN'S S-90 FORBIS 1962:81	BO/B	BE	17	1650	60	+300
EcPl-1	OLD WOMEN'S S-91 FORBIS 1962:81	BO/B	PL	25	1840	70	+110
EcPl-1	OLD WOMEN'S S-89 FORBIS 1962:81	BO/B	OW	13	1020	80	+930
EcPn-2	RL-797 WILSON PERSONAL COMMUNICATION	BO	PL	NA	2440	110	-490
EcPn-2	RL-798 WILSON PERSONAL COMMUNICATION	CH	OW	NA	560	100	+1390

Table 4 Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
EcPp-24	RL-1461 QUIGG 1982a:17	BO	IND	NA	1660	130	+290
EcPp-24	RL-1564 QUIGG 1982a:17	BO	IND	NA	720	110	+1230
EcPp-24	RL-1563 QUIGG 1982a:17	BO	IND	NA	1370	110	+580
EdOn-7	SHAW BURIAL S-1017 WILMETH 1978:95	BO	IND	NA	1390	90	+560
EdPc-1	MAJORVILLE S-854 CALDER 1977:42; WILMETH 1978:92	BO	IND	16	2090?	210	-140
EdPc-1	MAJORVILLE S-856 CALDER 1977:42; WILMETH 1978:92	BO	MK	14	3845	160	-1895
EdPc-1	MAJORVILLE S-855 CALDER 1977:42, WILMETH 1978.92	BO	NA	12	2655	85	-705
EdPl-10	METKE RL-903 WILSON PERSONAL COMMUNICATION	BO	IND	NA	6930	260	-4980
IND	TRAVERS GX-1769 REEVES 1973:1229	CO	GEO	NA	6880	280	-4930
EdPn-8	RL-799 WILSON 1977; QUIGG 1981A:60	IND	PL	NA	2440	170	-490
EeOm-15	SFU-7 APLAND 1981	BO	? AV	NA	1680	100	+270
EeOm-15	SFU-7 APLAND 1981	BO	? AV	NA	1620	80	+330
EeOr-63	RL-1129 BRUMLEY AND SAYLOR 1979	BO	IND	NA	1240	120	+710
EePf-1	HAR-534 FORBIS 1977:17	CH,WO	OW	NA	60	70	+1890
EePl-1	AMBER BURIAL S-2095 BALDWIN PERSONAL COMMUNICATION	BO	IND	NA	1030	85	+920
EePk-272	HIGHWOOD BURIAL S-1962 BRINK AND BALDWIN 1982; BALDWIN 1980A	BO	PL	NA	2725	85	-775
EePl-218	DONALD RL-901 WILSON PERSONAL COMMUNICATION	BO	IND	NA	3660	150	-1710
EePm-102	DEWINTON BURIAL S-2093 BLADWIN PERS COMM; EYMAN AND FORBIS 1976	BO	IND	NA	550	70	+1400
EfOp 324	I-9855 QUIGG 1979:263	IND	OW	NA	450	80	+1500
EfOp-324	I-9856 QUIGG 1979:263	IND	OW	NA	275	80	+1675
EfPm-103	RL-1416 VAN DYKE PERSONAL COMMUNICATION (80-64)	CH	IND	NA	2040	110	-90
EfPm-104	RL-1417 VAN DYKE PERSONAL COMMUNICATION (80-64)	CH	PL	NA	2530	120	-580
EfPm-104	RL-1528 VAN DYKE PERSONAL COMMUNICATION (80-64)	CH	PL	NA	2290	120	-340
EfPm-134	MINDAPOR BURIAL S-2094 BALDWIN PERSONAL COMMINICATION	BO	IND	NA	520	55	+1430
EfPq-5	RL-1475 QUIGG 1981B; QUIGG 1982a:95	BO	BE - PL	NA	850	110	+1100
EfPq-5	RL-1584 QUIGG 1982a:95	BO	IND	NA	5070	160	-3120
EfPq-5	RL-1538 QUIGG 1982a:95	BO	IND	NA	3510	120	-1560
EfPs-1	WINDLE GSC-1744 WILMETH 1978:96	BO	IND	NA	2530	140	-580
EgPm-116	EDWORTHY PARK FLOODPLAIN RL-904 WILSON PERSONAL COMMUNICATION	BO	IND	NA	1560	120	+390
EgPm-126	CINEMA PARK RL-902 WILSON PERSONAL COMMUNICATION	BO	IND	NA	4630	160	-2680
EgPm-127	LITTLE SHADOW RL-906 WILSON PERSONAL COMMUNICATION	CH	IND	NA	4010	150	-2060
EgPm-179	HAWKWOOD RL-1276 VAN DYKE PERSONAL COMMUNICATION 1982	CH	PI - MC	NA	7030	210	-5080

Table 4: Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
EgPm-179	HAWKWOOD RL-1554 VAN DYKE PERSONAL COMMUNICATION 1982	CH	PI	1	8250	330	-6300
EgPm-3	MONA LISA LOCALITY C GX-6397-A WILSON PERSONAL COMMUNICATION	BO	IND	LOWER SOIL	8300	280	-6350
EgPm-3	MONA LISA LOCALITY C GX-6395-A WILSON PERSONAL COMMUNICATION	BO	SR	2	5470	150	-3520
EgPm-3	MONA LISA GSC-1209 WILSON 1974:34	BO	IND	NA	8080	150	-6130
EgPm-3	MONA LISA LOCALITY C GX-6396-A WILSON PERSONAL COMMUNICATION	BO	IND	UPPER SOIL	6580	205	-4630
EgPm-3	MONA LISA LOCALITY C GX-6394-A WILSON PERSONAL COMMUNICATION	BO	SR	1	5145	170	-3915
EgPm-3	MONA LISA LOCALITY C GX-6398-A WILSON 1980	CO	MC	UPPER SOIL	6580	205	-4630
IND	GOVERNMENT OF CANADA PIT RL-756 WILSON 1981:281	WO	IND	NA	640	100	+1310
IND	GALLELLI PIT RL-757 WILSON AND CHURCHER 1978:733	BO	IND	NA	11300	290	-9350
IND	PASKAPOO PIT RL-905 WILSON PERSONAL COMMUNICATION	SO	IND	NA	8710	230	-6760
IND	85TH STREET PIT GSC-1819 HARRISON 1973; WILSON 1980	WO/B	IND	NA	8400	150	-6450
IND	ORMAN RL-1059 WILSON PERSONAL COMMUNICATION	BO	IND	NA	400	100	+1550
EgPt-6	S-1372 QUIGG 1978:82-93	BO	PL	IND	370	75	+1580
EhPc-3	RL-1474 QUIGG 1981B:93 (80-126C)	BO	OW	1	410	100	+1540
IND	COCHRANE GRAVEL PIT GSC-612 CHURCHER 1968	BO	GEO	NA	10760	160	-8810
IND	COCHRANE GRAVEL PIT GSC-613 CHURCHER 1968	BO	GEO	NA	11370	170	-9420
EhPp-1	S-1522 QUIGG 1981A:60 (74-21)	BO	BE	NA	1980	85	-30
EiPo-51	HITCHING POST RANCH BETA-1627 WILSON PERSONAL COMMUNICATION	BO	HA	IND	3600	70	-1650
EIPf-1	DRY ISLAND BUFFALO JUMP S-1373 QUIGG PERSONAL COMMUNICATION	BO	OW	NA	530	80	+1420
FbOq-62	S-1221 QUIGG 1977	WO	IND	S	140	55	+1810
FbOr-57	LAZY DOG TIPI RING S-1238 QUIGG 1978:29	CH	OW	MA	475	50	+1475
FbOv-1	S-1240 QUIGG PERSONAL COMMUNICATION (76-25)	BO	IND	IND	380	50	+1570
FbOv-1	S-1239 QUIGG PERSONAL COMMUNICATION (76-25)	BO	IND	IND	375	90	+1575
FbOw-1	CASTOR CREEK IND REEVES 1973:1240	CH	OX	NA	4575	IND	-2625
FbPf-1	MUHLBACH GSC-696 WILMETH 1978:92	BO/C	BE	NA	1270	150	+680
FbPj-8	RL-856 SMITH AND REEVES 1968	IND	PL	NA	12007	130	+750
FcQa-8	GSC-1944 WILMETH 1978:98	CH	IND	NA	8030	200	-6080
FdOt-1	ANDERSON GX-6128A QUIGG PERSONAL COMMUNICATION	BO	IND	3	1015	170	+935
FdOt-1	ANDERSON GX-6130A QUIGG PERSONAL COMMUNICATION (78-24)	BO	BR	7	4370	210	-2420
FdOt-1	ANDERSON GX-6131G QUIGG PERSONAL COMMUNICATION (78-24)	BO	IND	12	960	120	+990
FdOt-1	ANDERSON GX-6131A QUIGG PERSONAL COMMUNICATION (78-24)	BO	IND	12	1225	175	+725
FdOt-1	ANDERSON GX-6129A QUIGG PERSONAL COMMUNICATION (78-24)	BO	BR	7	4345	160	-2395

Table 4 Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
FdOt-1	ANDERSON GX-6130G QUIGG PERSONAL COMMUNICATION (78-24)	BO	BR	7	5460	160	-3510
FdOt-1	ANDERSON GX-6128G QUIGG PERSONAL COMMUNICATION	BO	IND	3	885	130	+1065
FdOt-1	ANDERSON GX-6129G QUIGG PERSONAL COMMUNICATION (78-24)	BO	BR	7	4725	150	-2775
FdPe-4	BOSS HILL - LOCALITY 2 S-1165 DOLL 1976, 1980, 1982	BO	IND	(12)	200	60	+1750
FdPe-4	BOSS HILL S-1164 DOLL 1980, 1982; KIDD 1978	BO	IND	(271-289)	2335	70	-385
FdPe-4	BOSS HILL LOCALITY 2 S-1371 KIDD 1978; DOLL 1980, 1982	CH	PA	(280)	7750	105	-5800
FdPe-4	BOSS HILL S-1250 DOLL 1977A, 1979. 1980, 1982; KIDD 1978	OR	PA	(280-300)	6150	95	-4200
FdPe-4	BOSS HILL LOCALITY 1 S-1884 DOLL 1980, 1982	BO	OX	(129)	4790	475	-2840
FdPe-4	BOSS HILL - LOCALITY 2 S-1251 DOLL 1977A, 1979, 1980, 1982; KIDD 1978	BO	PA	(260-300)	7875	130	-5925
FdPe-4	BOSS HILL LOCALITY 1 S-1883 DOLL 1980, 1982	BO	AV - BE	(80)	1860	55	+90
FdPe-4	BOSS HILL LOCALITY 2 S-1483 DOLL 1979, 1980, 1982	CH & OR/A	PA	(355)	8090	310	-6140
FfPi-100	FULLERTON GSC-641 WILMETH 1978:89	CH	IND	NA	1230	130	+720
FfQl-1	WHITEHORSE CREEK ROCKSHELTER GAK-4882 HALL 1976	CH	IND	NA	3750	120	-1800
FgQl-9	MARY GREGG LAKE S-61892 BRINK 1980	CH	IND	NA	2545	400	-595
FhQf-10	S-2162 HUNT 1982	CH	IND	NA	735	170	+1215
FhQf-10	S-2161 HUNT 1982	CH	IND	NA	480	145	+1470
FiPm-8	DUFFIELD S-106 REEVES 1973 FROM MCCALLUM AND WITTENBURG 1962:24	IND	IND	NA	8150	100	-6200
FiPm-8	DUFFIELD GSC-767 REEVES 1973 FROM MCCALLUM AND WITTENBURG 1962:74	WO	IND	NA	8320	140	-6370
FiPm-8	DUFFIELD S-107 REEVES 1973 FROM MCCALLUM AND WITTENBURG 1962:74	WO	IND	NA	7350	100	-5400
FiPp-2	CORMIE RANCH S-684 LOSEY 1977a	CH	? BE	I	1095	130	+855
FiPp-2	CORMIE RANCH GAK-3808B LOSEY 1977a	BO/A	? MK	III	4490	190	-2540
FiPp-2	CORMIE RANCH BGS-80 LOSEY 1977a	CH	BE	II	1345	60	+605
FiPp-2	CORMIE RANCH GAK-3808A LOSEY 1977a	BO	MK	III	4000	120	-2050
FiPp-4	GAK-5436 LOSEY 1977a	CH	IND	NA	1360	80	+590
FiQl-1	GSC-1730 WILMETH 1978:98	CH	IND	NA	2870	180	-920
FjPh-101	FLACH S-874 WILMETH 1978:89	CH	IND	NA	3620	320	-1670
FjPi-1	MACE IND POLLOCK 1980	BO	OX	NA	2300	105	-350
FjPi-1	MACE IND POLLOCK 1980	BO	OX	NA	3140	70	-1190
FjPi-29	SFU-119 DRIVER ET AL 1982	BO	? NA - MK	NA	2820	80	-870
FjPi-29	GX-6276A NEWTON AND POLLOCK 1979	BO-AP	IND	NA	2185	190	-235
FjPi-29	STRATHCONA SCIENCE PARK GX-6276-G NEWTON AND POLLOCK 1979; POLLOCK 1980	BO	OX	NA	2020	105	-70
FjPi-29	STRATHCONA SCIENCE PARK S-1700 POLLOCK 1980	BO	OX	NA	2045	45	-95

Table 4: Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
FjPi-29	STRATHCONA SCIENCE PARK S-1701 POLLOCK 1980	BO	OX	NA	3730	80	-1780
FjPp-1	S-1484 QUIGG 1981A:60	IND	IND	NA	2300	105	-350
FlOv-1	ST. BRIDES BURIAL S-1810 BALDWIN PERSONAL COMMUNICATION; BALDWIN 1980B	BO	IND	NA	1300	60	+650
FlQs-27	WEASEL S-1587 BRINK PERS COMM	IND	IND	NA	1845	50	+105
FlQs-30	GRANDE CACHE LAKE S-1886 BRINK PERSONAL COMMUNICATION	CH	IND	NA	1770	170	+180
FlQs-30	GRANDE CACHE LAKE IND BRINK PERSONAL COMMUNICATION	CH	IND	NA	4605	75	-2665
FlQs-30	GRANDE CACHE LAKE S-1899 BRINK PERSONAL COMMUNICATION	CH	IND	NA	5635	2180	-3685
FlQs-30	GRANDE CACHE LAKE S-1887 BRINK PERSONAL COMMUNICATION	CH	IND	NA	2880	280	-930
FlQs-30	GRANDE CACHE LAKE S-1891 BRINK PERSONAL COMMUNICATION	CH	IND	NA	2040	700	-90
FlQs-30	GRANDE CACHE LAKE S-1890 BRINK PERSONAL COMMUNICATION	CH	IND	NA	380	305	+1570
GaQs-1	SMOKY BIRM-710 BRINK 1977	BO	IND	NA	1490	140	+460
GaQs-1	SMOKY GAK-6140 BRINK 1977	CH	IND	NA	1940	210	+10
GaQs-1	SMOKY BIRM-714 BRINK 1977	BO	IND	NA	4490	140	-2540
GbOs-100	CARIBOU ISLAND GSC-1068 WILMETH 1978:86	NA	IND	4	4710	150	-2760
GbOs-100	CARIBOU ISLAND GSC-1068 WILMETH 1978:86	CH	MK	4	4200	140	-2250
GdQp-1	TUKWAKIN S-1478 UNPUBLISHED - A.S.A. FILES	CH	PL - MK	3	1970	95	-20
GhPh-102	S-518 GRUHN 1969	CH	IND	NA	365	55	+1585
GhPh-103	SUTTON GAK-1889 WILMETH 1978:96	WO/C	IND	NA	0?	80	+1950
GhPh-106	CALLING LAKE GSC-1140 WILMETH 1978:99	CH	IND	NA	410?	130	+1540
GhPh-8	GSC-1034 WILMETH 1978:99	CH, WO/C	IND	NA	1190	130	+760
GhPh-8	GSC-1035 WILMETH 1978:99	CH	IND	NA	1150?	160	+800
GjPx-6	HIDDEN CREEK S-2172 UNPUBLISHED A.S.A. FILES	BO	IND	3	1270	315	+680
GjPx-6	HIDDEN CREEK S-2173 UNPUBLISHED A.S.A. FILES	BO/B	IND	3	745	215	+1205
GkQn-100	KARPINSKY S-517 WILMETH 1978:91	CH	IND	NA	1070	55	+880
HcOn-1	S-1275 POLLOCK PERSONAL COMMUNICATION	IND	IND	NA	1735	105	+215
HcOn-3	DENSMORE S-1274 POLLOCK 1978	BO	IND	NA	570	115	+1380
HjPc-4	RL-533 DONAHUE 1976a:43	CH	IND	NA	3610	120	-1660
HkPa-12	S-1982 IVES 1981	CH	IND	NA	865	75	+1085
HkPa-13	TUMAXALE S-1973 IVES 1981	PE	IND	NA	2030	105	-80
HkPa-14	PELICAN BEACH S-2175 IVES PERSONAL COMMUNICATION 1982	CH	IND	3	660	70	+1290
HkPa-14	PELICAN BEACH S-1974 IVES 1981	CH	IND	NA	1280	95	+670
HkPa-14	PELICAN BEACH S-2177 IVES PERSONAL COMMUNICATION 1982	CH	IND	2A	470	155	+1480

Table 4. Continued

SITE #	SITE NAME LAB NUMBER REFERENCE(S)	MATERIAL	ASSOCIATION	LEVEL	BP	SD	CE
HkPa-14	PELICAN BEACH S-2176 IVES PERSONAL COMMUNICATION 1982	CH	IND	4	1335	155	+615
HkPa-4	EAGLENEST PORTAGE DIC-720 IVES 1977	CH	IND	NA	1030	110	+920
HkPb-1	SATSI S-2174 IVES PERSONAL COMMUNICATION 1982	CH	IND	NA	2795	85	-845
IfPo-1	S-1243 GERRY CONATY PERSONAL COMMUNICATION	IND	IND	NA	5065	90	-3115
IfPo-1	RL-529 DONAHUE 1976a:43	CH	IND	NA	1440	100	+510
IfPo-1	S-1242 GERRY CONATY PERSONAL COMMUNICATION (76-11)	IND	IND	NA	3490	100	-1540
IfPo-1	RL-531 DONAHUE 1976a:43	CH	IND	NA	4100	130	-2150
IfPo-1	S-1245 GERRY CONATY PERSONAL COMMUNICATION	IND	IND	NA	4765	85	-2815
IfPo-1	RL-532 DONAHUE 1976a:43	CH	IND	NA	5220	100	-3270
IfPo-1	S-1244 GERRY CONATY PERSONAL COMMUNICATION	IND	IND	NA	3585	60	-1635
IfPo-1	RL-530 DONAHUE 1976a:43	CH	IND	NA	2260	110	-310
IgOo-1	BIG BAY GAK-3797 WRIGHT 1975:11	CH	IND	3	0?	420	+1950
IgOo-1	BIG BAY GAK-3798 WRIGHT 1975:11	CH	IND	3	1260	170	+690
IgPc-2	PEACE POINT S-2067 STEVENSON 1981A, 1981B, IN PRINT	BO	IND	(100)	1405	95	+545
IgPc-2	PEACE POINT S-2068 STEVENSON 1981A, 1981B, IN PRINT	BO	IND	(100)	1395	110	+555
IgPc-2	PEACE POINT S-2065 STEVENSON 1981A, 1981B, IN PRINT	BO	IND	7A	1370	90	+580
IgPc-2	PEACE POINT S-2158 STEVENSON 1981A, 1981B, IN PRINT	BO	IND	16	2210	155	-260
IgPc-2	PEACE POINT * S-2066 STEVENSON 1981A, 1981B, IN PRINT	BO/B	IND	11B	450	260	+1500
IgPc-2	PEACE POINT S-2070 STEVENSON 1981A, 1981B, IN PRINT	CH, BO/B	IND	(100)	1385	125	+565
IgPc-2	PEACE POINT * S-2066 STEVENSON 1981A, 1981B, IN PRINT	BO/B	IND	11B	1320	300	+630
IgPc-2	PEACE POINT S-2157 STEVENSON 1981A, 1981B, IN PRINT	BO/B	IND	6	1040	75	+910
IgPc-2	PEACE POINT S-2069 STEVENSON 1981A, 1981B, IN PRINT	BO	IND	7A	1365	90	+585

* Two dates were taken from the same sample.
The older date is considered acceptable.

Table 5: Relation of Radiocarbon Dates and Dated Sites to Total Recorded Sites

BORDEN AREA	TOTAL # SITES*	TOTAL DATED SITES	TOTAL DATES
DO	599	13	20
DP	1645	44	132
EO	3009	16	37
EP	3582	34	53
EQ	35	0	0
FO	697	6	14
FP	2134	11	28
FQ	454	7	13
GO	277	1	2
GP	405	5	7
GQ	193	3	5
HO	338	2	2
HP	97	6	9
HQ	142	0	0
IO	83	1	2
IP	74	2	17
IQ	13	0	0
TOTAL:	13,777	151	341

* After Back 1982

Table 6: Summary of the Date Associations

ASSOCIATION	NO. OF DATES
AV	21
BE	18
BR	6
HA	3
KP	2
MC	11
MK	13
OW	48
OX	12
PA	4
PI	14
PL	21
SR	2
AV-BE	1
AV-OW	5
BE-PL	4
BR-OX	1
BR-SR-MK	3
HA-MK	1
HA-PL	1
KP-PL	3
MK-PL	3
OX-MC	1
OX-MK	1
PI-MC	1
PL-BR	1
GEO	6
IND	134
TOTAL:	341

FIRST RESULTS FROM DRY ISLAND BUFFALO JUMP PROVINCIAL PARK, 1982

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Archaeological Survey of Alberta

Bruce F. Ball
Archaeological Survey of Alberta

INTRODUCTION

Archaeological investigations were conducted at Dry Island Buffalo Jump Provincial Park during the summer of 1982. The project was undertaken primarily in response to Provincial Parks' request for information about the extent and nature of the bison jump site within the Park. The timing of this request was opportune as several general research priorities set for the Parklands could be addressed during the Dry Island Buffalo Jump Provincial Park study. These included the initiation of a study of prehistoric bison utilization in the Parklands region of the northern Plains, evaluation of the reliability and validity of test pit sampling, and a test of the utility of Watson's (1976) flotation machine for a central Alberta site. This report outlines some results from the Dry Island project which stand as the initial contribution toward answering the larger research objectives outlined for the parkland region of central Alberta.

Dry Island Buffalo Jump Provincial Park occupies approximately 1000 ha along the west side of the Red Deer River Valley, about 60 km southeast of Red Deer, Alberta (Figure 31). The Park is quite spectacular with a landscape that is dominated by "Badland" topography. The study area is part of the Aspen Parkland ecoregion (Strong and Leggat 1981:14) and is normally characterized by short, relatively dry, hot summers and extended cold, dry winters. Local topography plays an important role in determining the sequence of vegetation from the Prairie level to the river valley

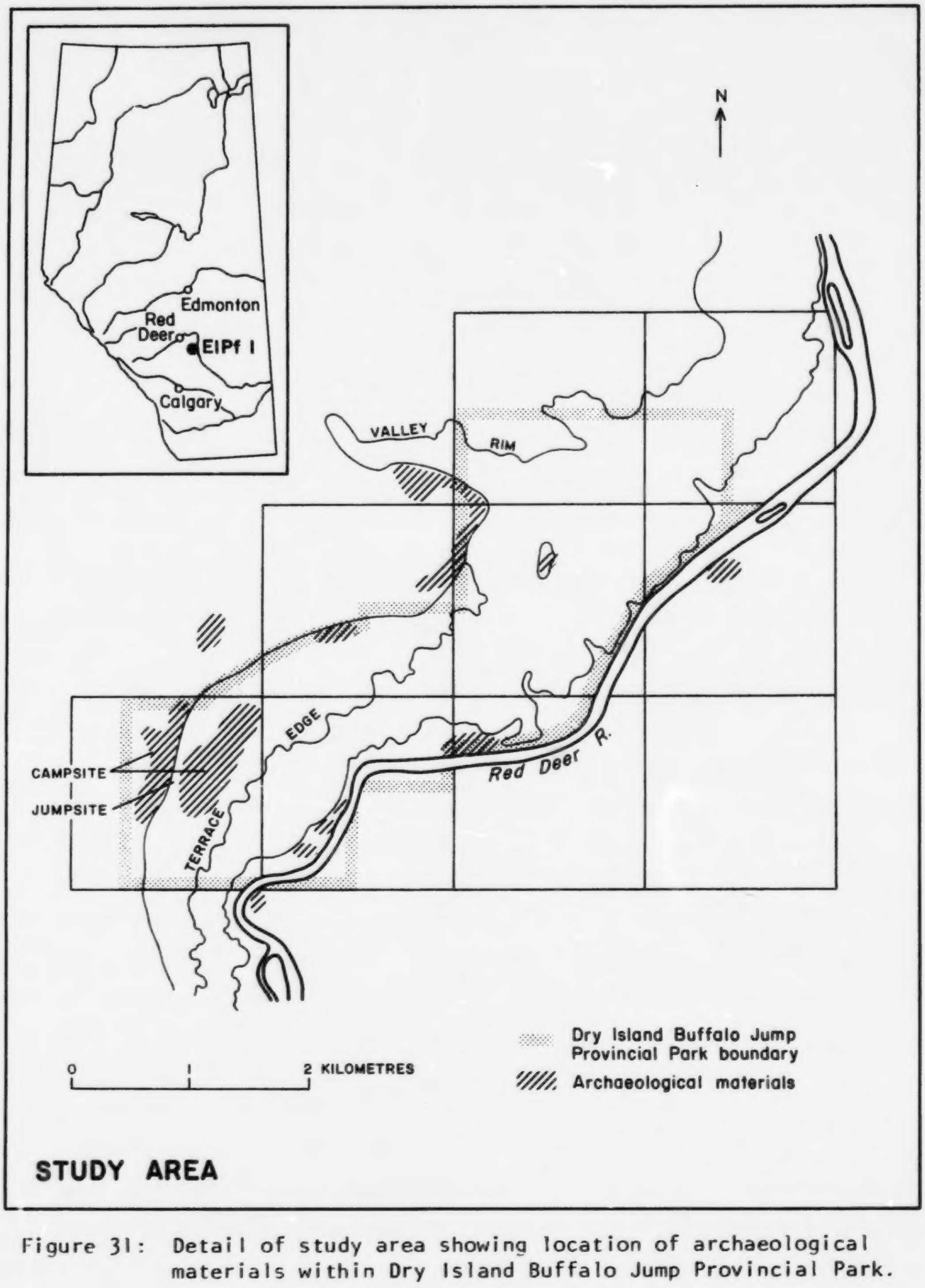
Edmonton
Red Deer
EIPf I
Calgary
N
VALLEY RIM
EDGE
TERRACE
Red Deer R.
CAMPSITE
JUMPSITE
0
1
2 KILOMETRES
Dry Island Buffalo Jump Provincial Park boundary
Archaeological materials
STUDY AREA

Figure 31: Detail of study area showing location of archaeological materials within Dry Island Buffalo Jump Provincial Park.

floor. Figure 32 is a transverse profile of the river valley passing through the jump site and associated site areas showing the magnitude of relief and different elevational zones of the study area.

OBJECTIVES AND METHODOLOGY

The primary purpose of the 1982 field program was to identify the nature and extent of archaeological materials within the park. This goal was addressed through the formulation of several specific research objectives. These were: 1) to assess, map and describe the nature of the jump site components; 2) to evaluate the extent and functional characteristics of the two main campsite areas, one on the prairie level and the other occupying the intermediate terrace below the jump; and, 3) to establish the range of variation of prehistoric activities and their distribution within the park. Campsite, in this report, refers to a concentration of materials thought to have accumulated through a period of intensive use or through periodic reuse.

The vertical distribution of archaeological materials noted in Figures 31 and 32 (i.e. the prairie, vis-à-vis jumpsite and the intermediate valley terrace areas) presented an interesting problem for site variability analysis and is addressed herein. While materials were recorded throughout the park there were some areas which possessed more or less continuous distributions of cultural items (see Figure 31). Of these, the areas immediately above and below the jumpsite revealed the more concentrated occurrence of archaeological remains.

Investigation of the jump site consisted of column sampling the deposits and mapping the distribution of materials on the slump block. Visual examination of the eroded face of the slump block indicated the existence of a minimum of three discrete bone lenses, the lowest being at 1.3 m below surface. Column sampling of these deposits appeared to be the best approach given the exploratory nature of our research objectives, available time, and crew size (4). Four, 50 cm^2 columns were removed in 10 cm levels (Figure 33) and processed offsite using Watson's (1976) flotation technique.

The campsite areas above and below the jump were assessed utilizing

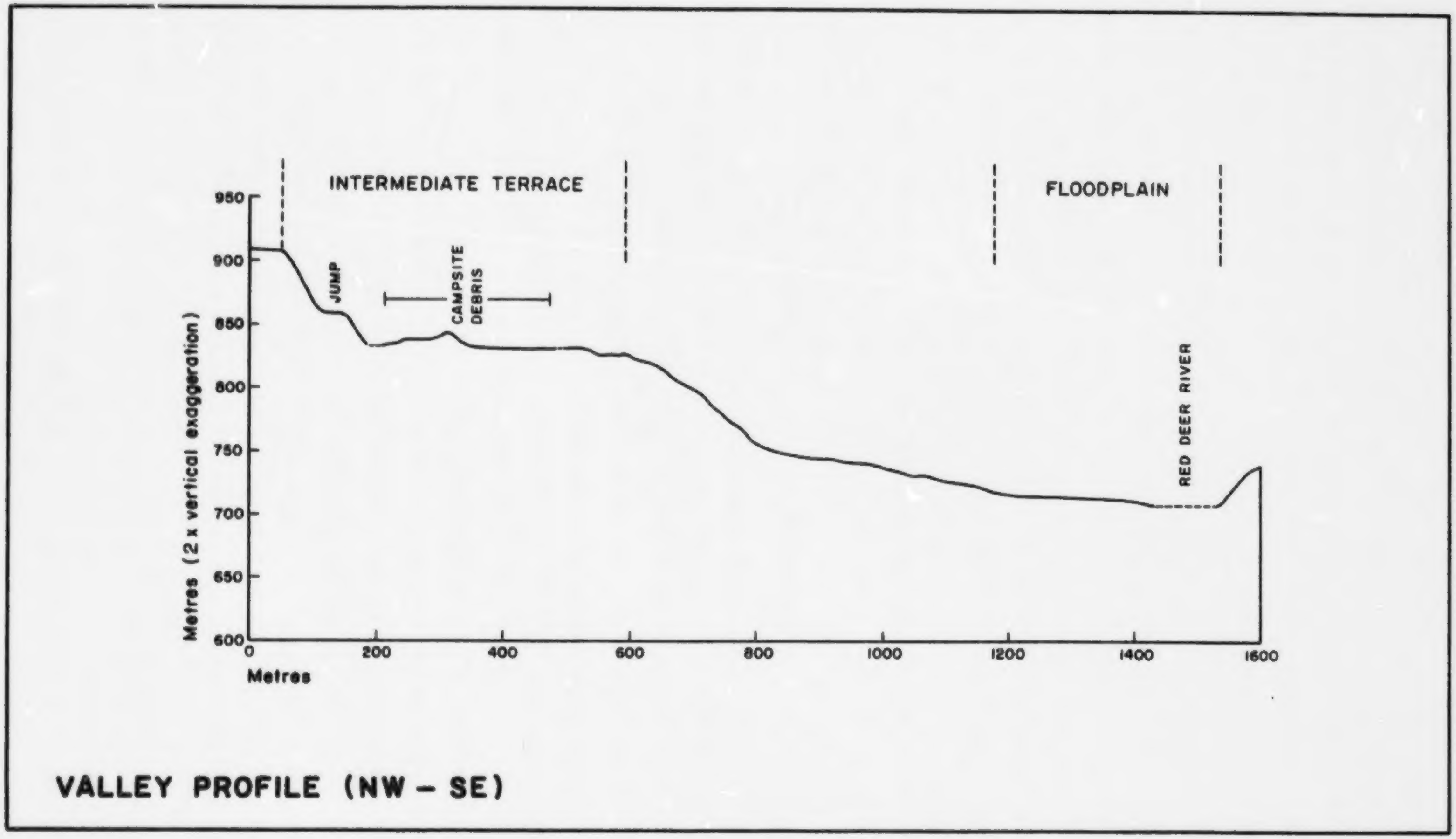

Figure 32: Transverse profile of the Red Deer River Valley at the location of the Bison Jump.

a variety of techniques, including foot survey and examination of surface exposures, test pit sampling, and test excavation. Surface visibility on the prairie level above the jump was excellent given the absence of crop cover. Additional information pertaining to this area was obtained through a test pit sampling strategy utilizing a 5 m grid pattern placed over the site area; the excavated matrix of each test unit was passed through a .65 mm mesh screen. This was undertaken as part of a study aimed at examining the effectiveness, efficiency and reliability of test pit sampling (Nance and Ball 1982).

The intermediate terrace below the jump was surveyed for the most part by examining natural exposures. However, test pit sampling was used intensively in two locations. In addition, four larger test units were excavated below the jump site, consisting of three 1 m^2 and one 2 m^2 units. Both the test excavation and test pit sampling matrix was passed through .65 cm mesh screens and the column samples were retained for the test excavation units for subsequent processing by flotation.

Those portions of the park outside of the jump and main campsite areas were assessed using simple visual examination of the ground surface. Previous survey (Thomson 1973) noted that materials rarely occurred in discrete clusters; they usually merged into one more or less continuous distribution. Given that the materials in other areas of the park (see Figure 31) may or may not be related to the jump and main campsite areas, they were assigned separate designations.

RESULTS AND DISCUSSION

Data recovered from Dry Island indicates that this site had been used only periodically over the last 3,000 years. The two campsite areas, one above and the other below the jumpsite, appear to be coeval with the jump, although the range of activities conducted at these camps appear to have been decidedly different. The test pit sampling program has yielded useful information regarding the efficiency of this technique in investigating site structure and extent. Finally, the flotation device worked satisfactorily and resulted in the recovery of valuable data that might otherwise have been overlooked.

Flotation of the jumpsite column samples resulted in the recovery of floral remains from the bone bed deposits. Of these, seven species tentatively have been identified as being of ethnobotanical importance. These are *Cheropodium album*, Polygonum sp, *Polygonum clinoda*, Fragaria sp, Rubis sp, Prunis sp and Rosaceae.

Prior to the 1982 investigations, only two lithic items were reported from the jumpsite deposits. Following the bulk processing of the column samples, it is now evident that lithic remains occur in all cultural levels of the jump and that bone lenses present in the jumpsite area are not continuous throughout and that the two lowest levels appear to merge towards the back of the slump block (columns 2 and 3, Figure 33). The bone levels are composed of elements which are oriented horizontally, more indicative of a veneer of bone as opposed to vertical accumulations of bone typically seen at other jump sites (e.g. the Vore site, Reher and Frison 1980; the Gull Lake site, Kehoe 1973). The sediment accumulation between the bone lenses varies from 40 to 60 cm in thickness. Available evidence indicates that these colluvial deposits accumulated gradually over time rather than as the result of some cataclysm. This indicates that the jump facility experienced prolonged periods of disuse.

Survey on the prairie level above the jump did not reveal evidence of drive lanes; presumably agricultural activities have long since obliterated any features that may have existed. It is of interest to note that the final approach to the jump at prairie level is an uphill rise, and that this effectively masks the presence of the valley rim until the last 5 - 10 m. The vertical drop from the valley rim to the slump block is some 50 m, an apparently atypical situation for most jumpsites (cf. The Vore Site, 15 m, Reher and Frison 1980:8; and Head-Smashed-In, 12-13 m, Reeves 1978:153). Such a distance may in part explain the absence of projectile points from the bone bed deposits since the fall would have been sufficient to kill most of the bison. It is also possible that following primary butchering at the jump site, carcass sections would have been removed to a final processing camp site on the intermediate valley floor, along with any projectile points embedded in them. The distance from the surface of the slump block to the intermediate terrace

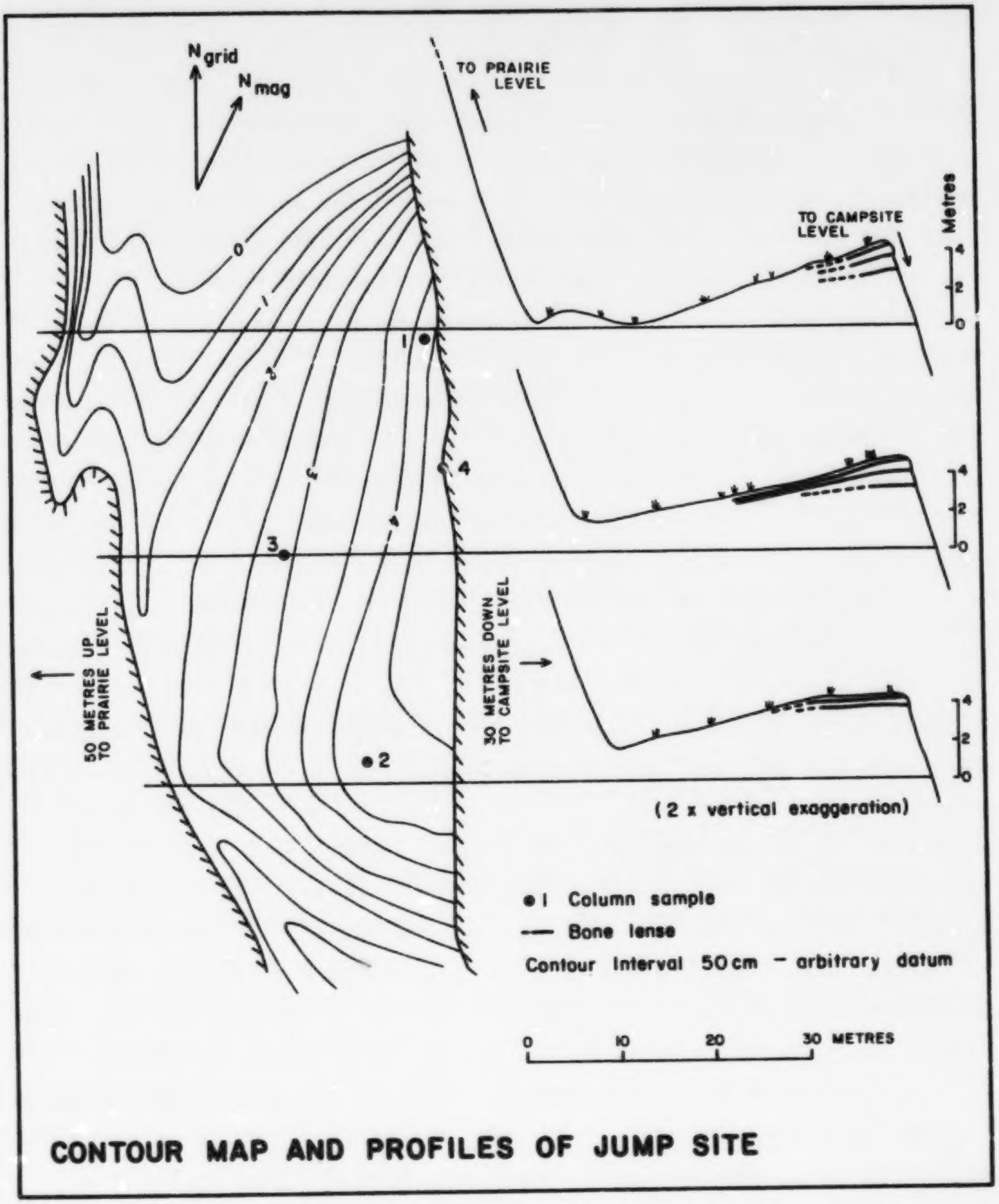
N grid
N mag
TO PRAIRIE LEVEL
TO CAMPSITE LEVEL
Metres
0
1
2
3
4
50 METRES UP TO PRAIRIE LEVEL
30 METRES DOWN TO CAMPSITE LEVEL
(2 x vertical exaggeration)
● 1 Column sample
— Bone lense
Contour Interval 50 cm – arbitrary datum
0 10 20 30 METRES
CONTOUR MAP AND PROFILES OF JUMP SITE

Figure 33: Contour map and profile of slump block showing vertical location of cultural materials. Horizontal distribution of materials is defined by the limits of the slump block.

is a 30 m vertical drop.

Notwithstanding the limited nature of the excavations in the intermediate terrace campsite area, a relatively large and diverse artifact inventory was recovered. Over 1,000 items have been catalogued. These include lithics, bone, shell and ceramics. Ceramics from one locale suggest the remains of up to six separate vessels. Analysis of these sherds indicates that they date within the last millenium, possibly confirming to Byrne's Period II ceramic stage of A.D. 1150-1700 (Byrne 1973: 341). Comparison of projectile point types suggests a maximum age of 2,000 years B.P. for the earliest exploitation of the study area. Identifiable types recovered include Avonlea, Besant and Late Plains Side Notch. Samples of bone from the intermediate terrace campsite and jumpsite areas were submitted for C-14 analyses but the results are not yet available.

The term campsite, in the past, has been given a variety of functional interpretations (i.e. Lee and DeVore 1968; Woodburne 1972; Yellen 1977; Binford 1978; 1980). Although both the intermediate terrace site below the cliff and the above jump prairie level site are so identified, initial comparisons of the material assemblages suggests different activity emphases. Above the jumpsite, the primary reduction of lithic resource materials appears to have been the dominant activity. Below the jump, however, there is a marked increase in the proportion of formed tools to debitage. This seems indicative of a site use more diverse in nature associated with general food processing and daily camp activities. Such traits are characteristic of a "residential base" (Binford 1980).

It is certain that the major attraction to Dry Island was the procurement of bison. Nevertheless, there is additional evidence to suggest that other food resources and animals were also utilized at the site. Faunal remains other than bison were recovered. These include bear, squirrel, gopher, elk and shell fish from the Red Deer River.

Analysis of Dry Island Buffalo Jump Provincial Park archaeological materials is not yet complete. Study of floral data recovered from the flotation samples is still in progress. As well, lithic analysis aimed at evaluating site diversity and test pit sampling efficiency are underway. These will be presented and discussed along with the results outlined above in a detailed final report.

SUMMARY

During the course of the 1982 field season, a program of archaeological survey and assessment was conducted within Dry Island Buffalo Jump Provincial Park in order to determine the nature and extent of the historic resources present. The exploratory goals of the project necessitated the gathering of survey information, test pit evaluation and limited test excavation data, and utilization of a flotation device to process the many bulk column samples that were collected. Resources identified to date include a late prehistoric bison jumpsite possessing multiple bone beds and an atypically precipitous vertical fall. Materials were recovered from most areas within the park and indicate a period of casual use between 3,000 - 500 years B.P. Two prehistoric campsite areas within the park were selected for detailed evaluation, and, while both are in close proximity to the jumpsite, their respective assemblages are markedly different. It seems apparent that these two areas are reflective of different activities associated with the use of the Dry Island Buffalo Jump. Continued study of the Dry Island data promises to add further detail to our current understanding of late prehistoric bison procurement strategies and processing activities in the Parkland area. The completion of the final report is anticipated this year and will contain a discussion of subsistence practises, ethnobotanical data and an evaluation of diversity as it relates to functional variability studies.

ACKNOWLEDGEMENTS

Support for the project was provided by the Archaeological Survey of Alberta, Alberta Culture and the Department of Recreation and Parks. Thanks are due to Al Simms, at Rochon Sands Provincial Park and in particular Steve Briggs and Ian Sturgess at Dry Island Provincial Park. The crew consisted of Ball, Wright, Norma (Norm) Roth and Bill Perry, and at various other times throughout the project assistance was provided by Nick Todd, Eleanor Verbicky, Jean Williams, Craig Shupe, Elaine Ball, Don Ball, Laraine Hess and James McCormick. Tim Schowalter was instrumental in providing valuable information about the site and the surrounding area. As well, we wish to thank Mr. and Mrs. Walter Schowalter for their hospitality and Walter Schowalter and Robert Graham for invaluable information about the site. Finally, acknowledgement is due to Ray LeBlanc and Dave Burley for editorial assistance and Kathy Miller, our able fingered secretary. The maps were drawn by Wendy Johnson.

OCCURRENCES OF TERTIARY HILLS WELDED TUFF IN NORTHERN ALBERTA

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INTRODUCTION

We wish to draw to the attention of other researchers working in Northern Alberta three occurrences of Tertiary Hills welded tuff. This material has sometimes been referred to as "Keele River welded tuff" (e.g. Donahue 1976b). Cinq-Mars (1973; pers. comm.) has identified a source for this material in the Northwest Territories and has suggested the name "Tertiary Hills welded tuff". One instance we report here has been noted earlier, and involves a small flake of this material which was recovered at the Eaglenest Portage Site (HkPa-4) in the Birch Mountains (Donahue 1976b:63;Ives 1977:35). The second specimen also comes from the Birch Mountains. Among the materials Sims (n.d.) excavated from the Gardiner Lake Narrows Site (HjPd-1) was a large lanceolate projectile point of welded tuff. Cinq-Mars has examined both Birch Mountains specimens and has concluded that they are Tertiary Hills welded tuff (Donahue 1976b:63; Cinq-Mars pers. comm.). Finally, LeBlanc (pers. comm.) has reported a flake of similar material from GjQa-3 in the Lesser Slave Lake area. Cinq-Mars has not examined this specimen.

The Tertiary Hills source documented by Cinq-Mars (1973) lies north of the Keele River, N.W.T. Yorath and Cook (1981) indicate that this welded tuff occurs within the recently named Summit Creek Formation. Exposed portions of this source are situated along an unnamed creek which drains into the north end of the Tate Lake. The source occurs at roughly

64° 28' north latitude and 125° 40' west longitude. The Eaglenest Portage Site is at 57° 44' 46" north latitude and 112° 09' 00" west longitude, while the Gardiner Lake Narrows Site is at 57° 30' 35" north latitude and 112° 30' 20" west longitude. GjQa-2 is situated at 55° 20' 25" north latitude and 116° 09' 40" west longitude.

CHARACTERISTICS OF THE ARTIFACTS

The Gardiner Lake Narrows specimen is the largest of the three (Figure 34). It is 87.0 mm long, 25.8 mm wide and 10.0 mm thick. The specimen is light gray in colour (7.5 YR 8/0), with a lustre which varies between vitreous and glimmering. Under some orientations, the artifact has a bluish gray hue. Basically, the specimen is an amorphous glass which is also highly vesicular. There is a small amount of devitrification. A series of laminar bands transect this specimen. These may represent material that was not welded together in the tuff, or the effects of weathering along fractures in the material. A large number of small, dark glass shards were observed during microscopic examination. The surface of the specimen shows a conchoidal fracture pattern.

The Eaglenest Portage Site specimen is markedly similar to the Gardiner Lake Narrows specimen (Figure 34). It is gray in colour (2.5 Y 6/0). Dark glass shards within this artifact are a lighter brown in colour, however, and this may result from weathering.

The GjQa-3 specimen is dark gray in colour (7.5 YR 4/0), and translucent to opaque in appearance. The cortical surface has a dull sheen, while the opposite surface has a vitreous lustre. This specimen is composed of highly vesicular, amorphous glass. It contains small dark glass shards. Devitrification is present. Conchoidal fracture pattern is evident on the surface of the specimen.

CHARACTERISTICS OF TERTIARY HILLS WELDED TUFF

These characteristics conform to the macroscopic attributes provided by Cinq-Mars (1973). In their discussion, Yorath and Cook indicate that

> ... between sections 2 and 3, a small, lens-like body of white to light grey, dense, finely vesicular, glassy material occurs surrounded by baked, red, siliceous laminated

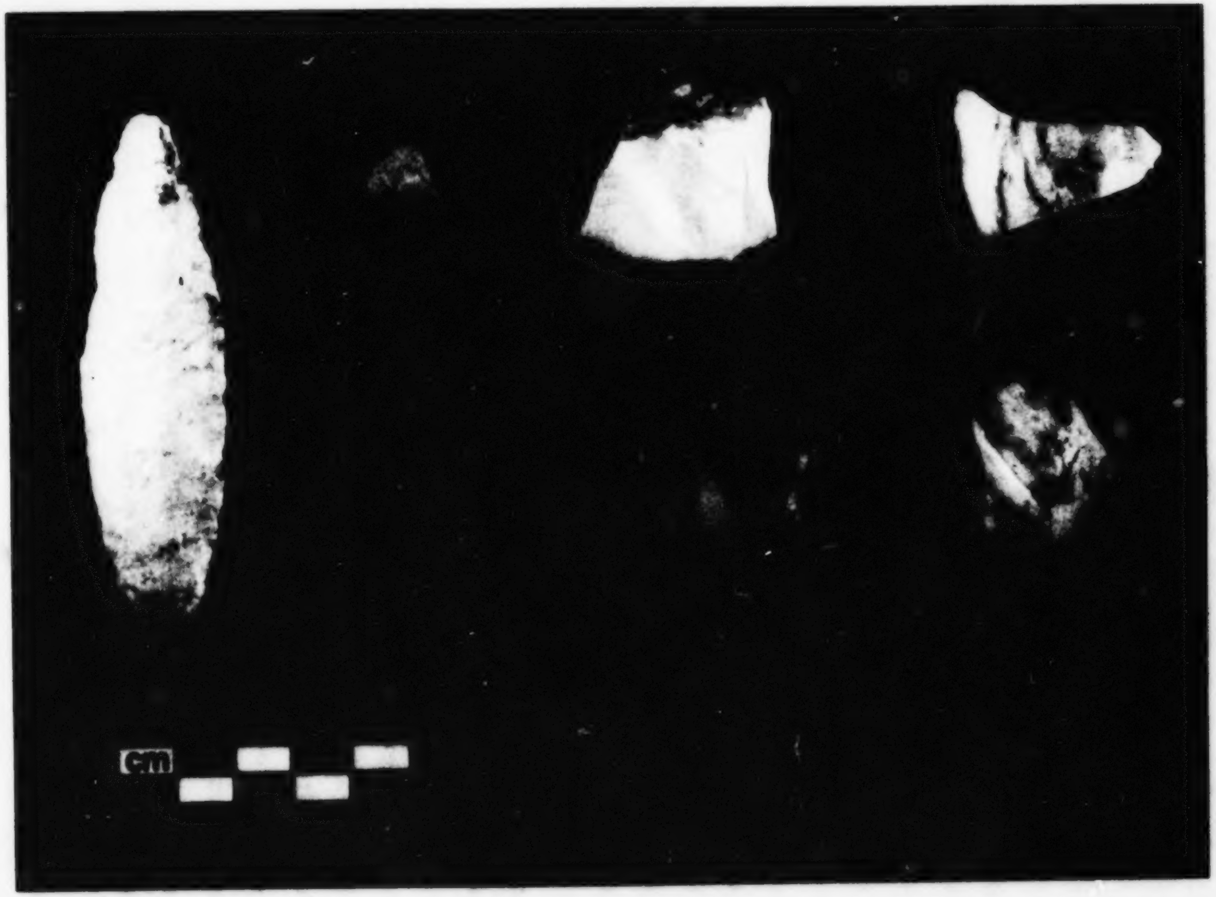

Figure 34: Specimens of Tertiary Hills welded tuff. The Gardiner Lake Narrows projectile point appears on the left. The Eaglenest Portage flake is at the top of the next column; the Slave Lake flake is immediately below it. All other specimens are raw material samples provided by Cinq-Mars.

> shale. The core of the outcrop appears to be volcanic in origin and is composed largely of calcium feldspar Talhs and devitrified glass. This locality appears to be unique (Yorath and Cook 1981:35).

Cinq-Mars (ibid.) described the material as glassy. Lustre ranged from dull to vitreous. There is also a range in material texture which may be related to vitrification, different grain sizes and the vesicular pattern. Colour is probably the least constant characteristic, and Cinq-Mars (1973: E9) cautioned that the Munsell Soil Colour Chart will not encompass the full range of variability. He described two principal colour classes. The first is a white-gray-black group. All samples belonging to this group fall within various modes of gray, although there is subgroup for various bluish hues. His second group is for red-brown-yellow, and again, there exists a significant colour range.

Cinq-Mars has been so kind as to provide raw material samples of Tertiary Hills welded tuff to the Archaeological Survey of Alberta (Figure 34). Specimens may be examined at the Archaeological Survey of Alberta upon request. In this raw material sample, we note that the raw material is an amorphous glass which is opaque and has a glimmering to vitreous lustre. In the case of lighter gray specimens, the material has an appearance similar to glazed porcelain. Laminar banding is present within some specimens. These bands exhibit changes in both colour and texture. Devitrification is present, and the material varies with respect to its vesicular nature. Some of the pieces have a "cindery" texture. This may indicate areas where the welded tuff was in contact with surrounding lithologics. The fracture pattern ranges from sub-conchoidal to conchoidal. In the sample, there are hues and chromas such as yellowish brown (10 YR 5/4), dark reddish brown (5 YR 3/2-3), dark red (2.5 YR 3/6), red (2.5 YR 5/6), white or light gray (7.5 YR 7-8/0) and very dark gray (7.5 YR 3/0).

REMARKS

Cinq-Mars (1973:E22) presented evidence from neutron activation studies which indicated that Yukon and Northwest Territories welded tuff artifacts did not exhibit a greater range of trace element variability than did raw material samples from the known source in the Tertiary Hills. This bedrock source consists of Tertiary formation tuff beds which are technically either welded or fused tuffs. Their precise depositional origin is not clear (ibid.). From available geological and archaeological data, Cinq-Mars (1973:E23) reached the conclusion that the Tertiary Hills area was probably a unique source for the welded tuff. Yorath and Cook (op. cit.) support this contention.

Given that this source is unique, the northern Alberta finds occur at great distance from the source. The Birch Mountains and Lesser Slave Lake are 100 - 1200 km on direct lines from the Tertiary Hills. By following the Peace and major rivers of the Mackenzie drainage systems, we find that Lesser Slave Lake is roughly 1750 km from the Tertiary Hills. We would caution, however, that the GjQa-3 specimen is least like the other Birch Mountains specimens and the raw material samples. It nevertheless appears to be a welded tuff of some sort.

In conclusion, we must imagine that these finds are near the south-eastern terminus of the Tertiary Hills welded tuff distribution. The material presumably arrived by trade, and its rarity is not inconsistent with our knowledge of band society exchange systems. This evidence for some form of exchange over a great distance complements a documented instance of Mount Edziza, British Columbia obsidian which Donahue (1976b) noted in the Caribou Mountains. Relatively little else may be said regarding the significance of these finds. All specimens are undated, and the Gardiner Lake Narrows projectile point is not sufficiently typologically distinct as to permit precise comparisons. Cinq-Mars (1973) reviewed evidence which indicated that Tertiary Hills welded tuff has been in use throughout most of the Holocene. He indicated sketchy evidence for a peak in exploitation between 3000 B.C. and the time of Christ (ibid.). The three Alberta finds fall within the gray-white-light blue spectrum of colours which also seems to be predominant farther north.

If the northern Alberta specimens arrived by trade (and this need not necessarily have been the case), the available meagre evidence would suggest that formed tools (subsequently maintained) may have been the object of trade. Only further instances of the material will permit more definite conclusions. We would encourage investigators to be vigilant for this raw material and to make comparisons with the raw material sample when suspected finds occur.

RADIOCARBON AGE ESTIMATES FROM THE SIBBALD CREEK SITE, EgPr 2

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INTRODUCTION

The Sibbald Creek site (EgPr-2) was first discovered in 1978 by Brink (1979a:79-80) during an assessment survey for Alberta Forest Service (Figure 35). More detailed investigations of the site were undertaken subsequently by Gryba (1980a, 1980b, 1980c; Gryba and Barnett 1981) for Alberta Transportation. Located in the foothills region 72 km west of Calgary, EgPr-2 is situated on a terrace overlooking a wide flat valley known as Sibbald Flat. A small stream called Sibbald Creek flows through the valley and joins Jumpingpound Creek at the eastern border of the valley. The site gained notoriety with the recovery of several projectile points from the lower deposits which compare stylistically with types known collectively as "Paleo-Indian". This report presents the results of the study undertaken to date the site by radiocarbon age determination.

The surficial geology of the Sibbald Flat area shows the site to be situated on a glacial outwash plain (Gryba and Barnett 1981:16). Gryba describes the cultural matrices to be underlain by colluvial deposits which originate from glacial deposits on the hill located immediately adjacent and behind the site area (Gryba and Barnett 1981:38). However, it is not clearly stated in the report what the origin of the actual matrix is. He notes the composition of the deposits to be fairly homogeneous; consisting mostly of sand, silts and clay with silts predominating and that an analysis of a soil profile noted the existence of ". . .volcanic ash in very low amounts in the 30-40 cm level (Gryba and Barnett 1981:44)." This ash is believed to have originated from Mt. Mazama and therefore dates to about

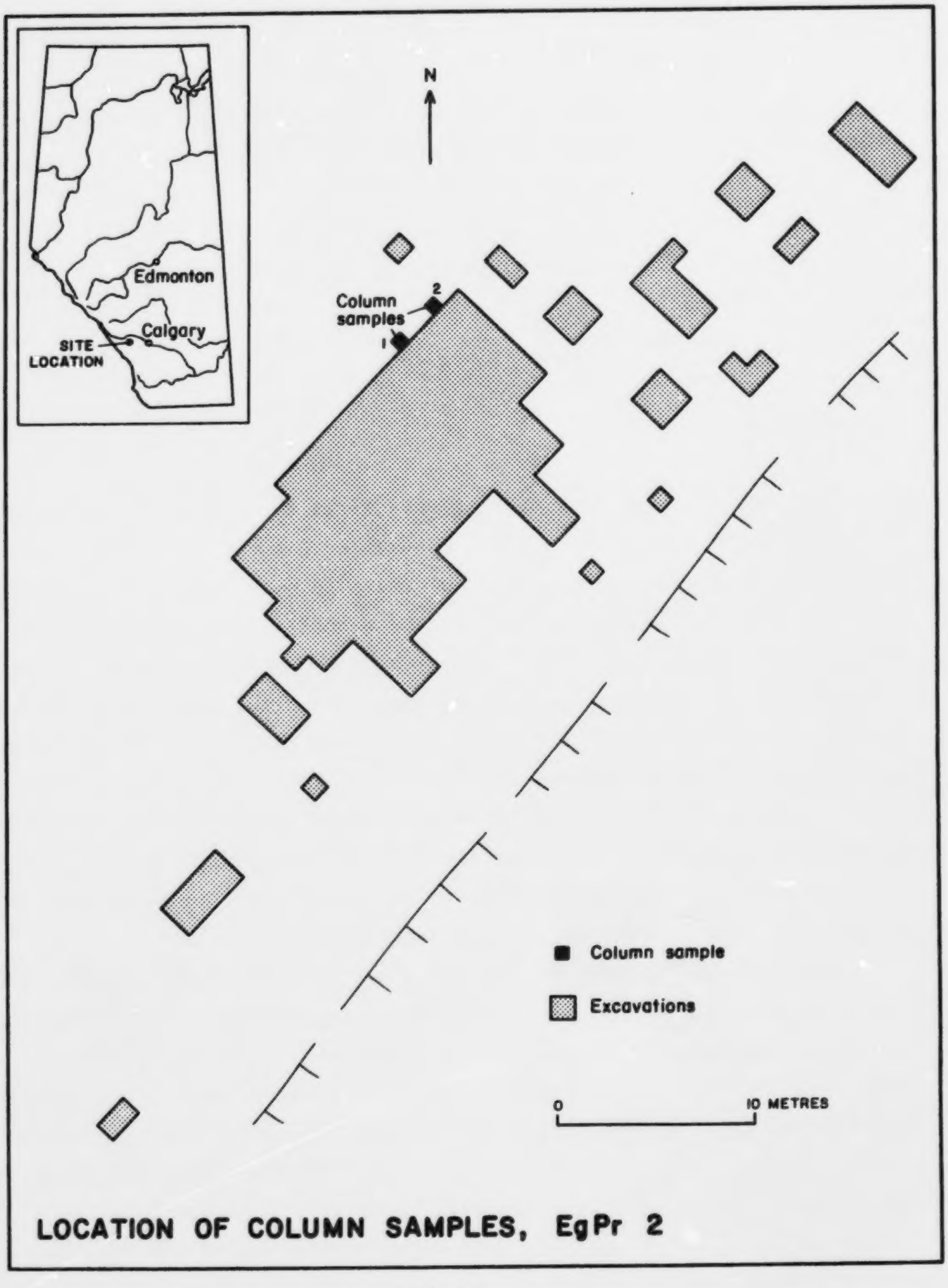
N
Edmonton
Calgary
SITE LOCATION
Column samples
1
2
Column sample
Excavations
0
10 METRES
LOCATION OF COLUMN SAMPLES, EgPr 2

Figure 35: Sample recovery location.

6600 years ago. The predominating silts and general composition of the deposits suggest that the matrix is aeolian in origin.

Gryba's efforts unearthed approximately 30% of the estimated site area (198 m^2) resulting in the recovery of over 10,000 artifacts. Using comparative point typology Gryba identifies a cultural history covering some 9,000 years. This is comprised of 13 cultural components. Despite the extent of excavation Gryba was unable to recover organic samples sufficient for a radiocarbon age determination of the deposits to support the comparative estimates based on point styles. Consequently, this report presents results from analyses of charcoal recovered from two column samples taken from the north wall of Gryba's excavation units (Figure 35).

The recovery of charcoal from EgPr-2 was attempted in an effort to substantiate the comparative age estimates of the site. Given the suggestion of depositional integrity the intention was to collect enough charcoal from 5 cm interval soil samples in a column for radiocarbon analysis. If successful, the resulting dates would either support or shed some doubt on the cultural historical interpretation.

It was our belief that the charcoal found in the cultural deposits of EgPr-2 was either the result of cultural activity or natural events such as forest fires which may have occurred at or about the same time as the cultural occupation. Dating carbon samples recovered from specific zones would provide estimates of the age of those stratigraphic horizons and thus provide a reasonable estimate of the age of the cultural component associated with the respective horizon.

DEPOSITIONAL INTEGRITY

Based upon the fact that refitted items and projectile points of similar morphology were recovered from different stratigraphic zones and were often separated horizontally as well, some comment regarding depositional integrity is warranted. This is important since the primary assumption of this dating excercise is that the dateable materials occurring with a respective depositional zone will provide an estimate of the age of that zone and therefore an approximate date for occupation.

The depth of deposit is relatively shallow, ranging from a few centimeters on the rim of the terrace up to 55 cm in depth in the central area of the excavation. Given the length of time the site was occupied and that soil deposition occurred relatively slowly, Gryba estimates deposition to be on the order of 1 cm per 250 years. The fact that some degree of integrity is present in the deposits is shown in Table 7 where the mean depth for various point types shows a general increasing trend from the late Plains types at the top to the "fluted tradition" types found in the deepest zones. Mean depths were calculated by assigning a single digit, from 1 to 9, for each of the point types respective depths. This means that a Plains Side notched point found in the 0-5 cm level would be assigned the number 1, a Plains Triangular point at the 5-10 cm level would be assigned the number 2, and so on. It is clear from Table 7 that some depositional integrity exists at the site. See Pyszczyk 1981 for a preferred technique to show the relative position of point styles.

SAMPLE RECOVERY AND ANALYSIS

Two locations along the north wall of Gryba's excavation area were selected for sample recovery. These were located 6.3 m and 3 m from the northeast corner of the excavation (Figure 35). The columns excavated were 50 cm by 50 cm by 5 cm deep with the exception of two levels at location 2 which were 10 cm in depth. At location 1, samples were taken to a depth of 45 cm.

In the laboratory, each of the soil samples was first immersed in water to soften the deposits and then passed through a series of screens, ranging from 1 cm to .87 mm. The resulting sample fractions of lithics, bone, charcoal and various flora and fauna were sorted and recorded. The amounts of charcoal recovered in this process are given in Table 8.

Three charcoal samples were selected for radiocarbon analysis: from location 1, sample number 6 (25-30 cm B.S.) and sample number 8 (35-40 cm B.S.), and from location 2, sample number 7 (35-45 cm B.S.). All samples consisted of wood charcoal.

RESULTS AND DISCUSSION

Three date estimates were obtained from the analysis undertaken by

Table 7 Mean depths of projectile point types from EgPr-2. Taken from Gryba and Bornet 1981.

Point Type	Number	Mean Depth	S.D.
Plains Side Notched	16	1.8	.8
Plains Triangular	3	1.67	1.15
Prairie Side Notched	7	2.71	.95
Besant	13	3.73	1.35
Pelican Lake	11	3.91	1.30
Hanna	1	3.0	-
Duncan	10	3.2	1.55
Oxbow	25	4.4	1.63
Mount Albion	8	7.88	1.25
Scottsbluff	1	9	-
Agate Basin	4	8.25	6
Midland	1	9	-
Fluted Point Tradition	2	9	0

Table 8 Charcoal recovered from column samples at EgPr-2.

Location 1

Sample Number	cm B.S.	Charcoal Recovered Weight (grams)
*6	25-30	3.4
7	30-35	5.65
*8	35-40	5.3
9	40-45	.73
10	45-50	-
Location 2		
2	5-10	17.1
3	10-20	17.16
4	20-25	9.76
5	25-30	5.6
6	30-35	7.2
*7	35-45	3.5

* Indicates the samples selected for C^{14} analysis.

Geochron Laboratories. These are:

Sample Number	D.B.S.	Lab Number	Age (Years B.P.)
1-6	25-30 cm	GX-8809	5,850 ± 190
1-8	35-40 cm	GX-8808	9,570 ± 320
2-7	35-45 cm	GX-8810	7,645 ± 260

Due to a problem encountered during the analysis, only the first and last of these estimates are believed to be reliable. The laboratory reports that following the analysis of sample number 1-8 (GX-8808), a counter used in the process was found to be malfunctioning and therefore it is uncertain whether an accurate count was made on this sample. Geochron advises that the estimate from this sample may be older than it should be and thus not a reliable estimate; therefore, this estimate should not be used.

The two other dates do compare generally with Gryba's chronological scheme (see Table 7). Given that: 1) the samples were recovered from one part of the site; 2) the deposits are generally shallow and, 3) the apparent Mazama Ash was recovered from the 30-40 cm level (i.e. below sample 1-6), the date of 5,900 years B.P. from sample 1-6 appears to be acceptable. Therefore, it is reasonable to conclude that the dated event relates to the cultural occupation of the site. Gryba and Barnett(1981:126) note the recovery of two point types at the 25-30 cm level, one Besant point and one Oxbow point. While Oxbow has been found to occur as early as 5040 years B.P. (Nero and McCorquadale 1958; Haines 1966), the date is too early for Besant. This anamoly reflects either minor mixing of the deposit in the area where the Besant point was recovered or that the 25-30 cm level at the artifact location does not correlate with the 25-30 cm level where the C-14 samples were taken. Gryba identifies five Oxbow points and one Mount Albion type (Benedict and Olson 1978:47-51) from the 20-25 cm level along with several other more recent types. Therefore, the date again seems reasonable.

The second date of 7,645 ± 260 also appears reasonable in comparison to the point types Gryba identifies from the lower stratigraphic horizons. In that the sample was recovered from deposits occurring between 35-40 cm below surface, it might include charcoal from several different events which occurred during the time it took to deposit 10 cm of matrix. Thus it must be viewed as an average for this level. This is even more so than for the previous date because it was recovered from 10 cm of deposit vis-à-vis the 5 cm of sample I-6. In this latter level Gryba has identified Mount Albion, Scottsbluff, Agate Basin, Midland and two unknown "fluted" types. Mount Albion points (Benedict and Olson 1978:47-51) are dated between 5,800 and 5,500 B.P. Scottsbluff is identified by Gryba on the basis of one "point base", although the evidence is equivocal. The date of 7,600 B.P. falls within the general time frame expected of this type.

Four examples of the Agate Basin point type are reported from EgPr-2 (Gryba and Barnett 1981:126). Frison (1978:32) notes that Agate Basin ". . .should date over 10,000 years ago. .". This is clearly much older than the date of 7,645 ± 260 years. It is possible however, that these might compare with what Frison refers to as Agate Basin-like (Frison 1978:32). Butler (1965) has identified an Agate Basin-like point, which is referred to as Haskett Type I.

> Wormington and Williams saw some similarity in form between the Haskett Type 1 and Agate Basin points, but remarked that the Agate Basin appeared to have been made by a different flaking technique. That is, the Haskett point fell within the range of variation in form of the Agate Basin points; however, the flake scars on the latter were neither as broad nor as neatly spaced as they were on the Haskett point (Butler 1965:7).

Based upon geological evidence and comparative cultural data from two other sites (Swanson et. al. 1964), Butler (1965:8) estimates the age of Haskett Type 1 points between 6,500-5,000 B.C. Comparing the EgPr-2 date with Butler's conclusions, it seems more reasonable to suspect something similar to Haskett rather than Agate Basin.

Midland points date to more than 10,000 years before present and not only occur with Folsom points in some sites (Frison 1978), but closely resemble Folsom except for the fluting. While the examples identified by Gryba as "midland" and "fluted point" types resemble those of the type sites, the date of 7,645 ± 260 years does not correspond with what would usually be expected for these point types.

In conclusion, it is shown that lower levels of EgPr-2 date to about 7,600 years ago. Confirmation of the older age estimate awaits additional information.

ACKNOWLEDGEMENTS

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TRENDS ON HISTORIC SURFACES: ESTIMATING DENSITIES AND DISTRIBUTIONS OF ARCHAEOLOGICAL REMAINS BY SYNAGRAPHIC MAPPING TECHNIQUES

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INTRODUCTION

The purpose of this study is to examine the frequency and distribution of the surficial archaeological remains recovered from Dunvegan (an early North West Company/Hudson's Bay Company (1805 - 1878) fur trade fort), and how they are associated with subsurface features and activity areas (Figures 36 and 37). The reason for this was to locate and separate the early North West and Hudson's Bay Company forts, and to assess the potential research and restoration value of the site.

The earlier forts, including a few buildings and stockades were successfully located. The rapid location of these forts and features was based on the common assumption that there existed a sound relationship between material cultural remains and human dwellings and their activity areas. The presence of large quantities of bone, artifacts, and building materials were not only expected to reflect general site boundaries but also delineate specific activity areas, buildings and refuse disposal areas within the fort boundaries. At Dunvegan, the collection of data to examine this problem was relatively easy, as the site had been plowed for over 40 years. A systematic surface survey of the site was carried out with the aim of developing a method to use the data to assist in planning future research strategies.

CULTURAL MATERIAL REMAINS AND CULTURAL FEATURES

The distribution and frequency of material culture remains at

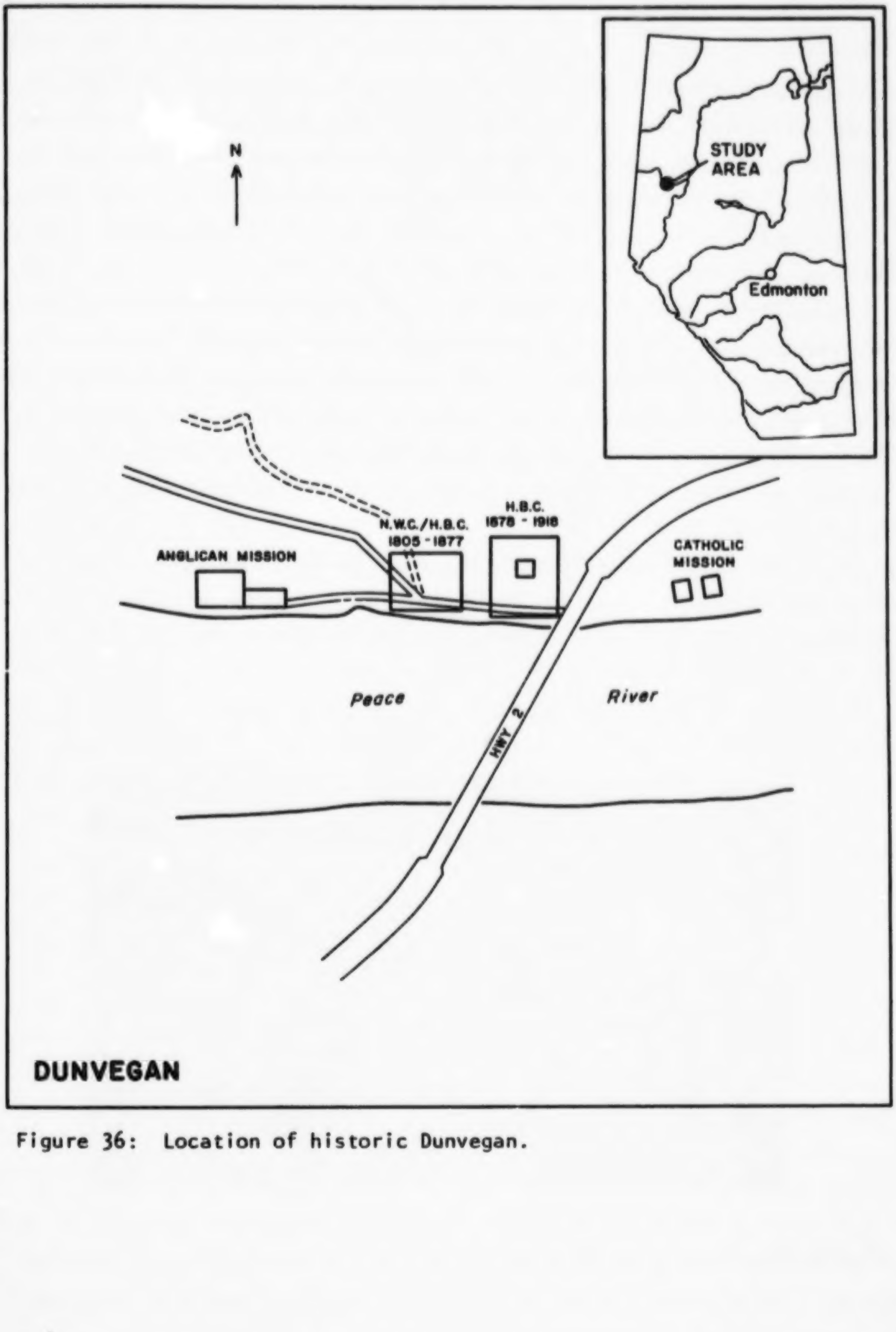
N
STUDY AREA
Edmonton
ANGLICAN MISSION
N.W.C./H.B.C. 1805 - 1877
H.B.C. 1878 - 1918
CATHOLIC MISSION
Peace
River
HWY 2
DUNVEGAN

Figure 36: Location of historic Dunvegan.

archaeological sites should reflect the length, intensity, and type of human activities that were carried out in the area. However, any patterns from these distributions may become distorted because of post-occupation activities such as plowing, collecting and erosion (Schiffer 1976; South 1977). What is left for the archaeologist is a distorted pattern that has gone through human and natural filters.

Generally, however, even when refuse from certain site areas has been removed and redeposited elsewhere, enough material is left behind to reveal discernible patterns (Losey et. al. 1977, 1978; Pyszczyk 1978; Prager 1980). This seems especially true when we examine materials associated with features such as refuse pits, middens, buildings and fort stockades; all have a related set of material remains as well as a distinct distribution and frequency pattern.

Besides the information on refuse disposal patterns that can be gathered from excavated fur trade posts, old fur trade journals are an invaluable source of information on these and other aspects of human behavior.

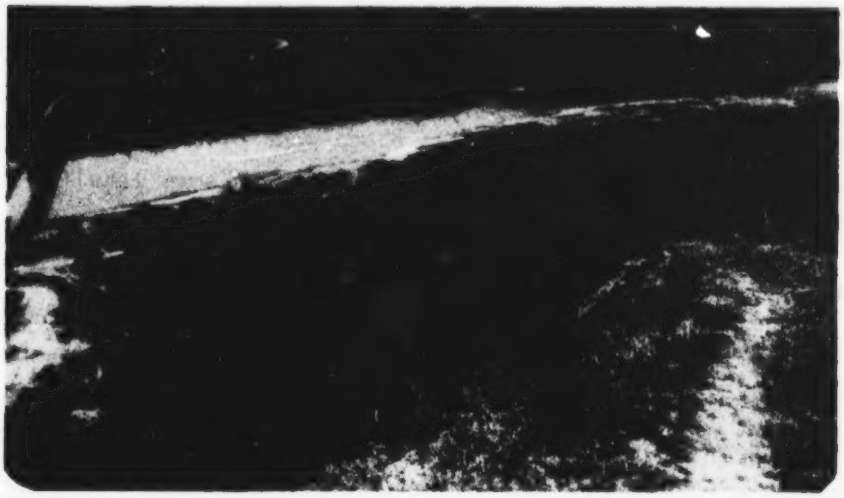

Figure 37: View of historic Dunvegan

Many references are made to the men cleaning out the stockade areas and buildings in the spring (Coues ed. 1897; Johnson 1967; Morton 1929; Campbell 1823-30, 1839-49; McLeod 1806-07). The refuse was either burned, buried, or deposited somewhere outside the fort walls. Such disposal patterns were apparent at Forts Victoria, George, Vermillion, White Earth, and Buckingham House (Pyszczyk 1978; Nicks 1977). Accumulations of refuse were often found near fort gateways; a similar pattern has also been noted by South (1977) at American Colonial sites. Although these observations are general, they indicate that the distribution of cultural remains on the fort compound grounds should be relatively low. Remains should sharply increase in some areas outside the fort, especially near gates, then steadily decrease further away from the walls, or there may be no increase, but rather a steady decrease away from the walls.

Lewis (1976) noted at colonial sites that household refuse was buried near dwellings in an area which has been called the toft (Hurst 1971), a feature that was prevalent during medieval and post-medieval time in England. A similar pattern exists at some fur trade sites. Pits, filled with bones and artifacts, are often closely associated with dwellings (Losey et al. 1978, 1979). Spatially, these pits could be identified by clusters of bones and artifacts occurring near buildings in highly concentrated frequencies. The location of these clusters should be discernible from quantifying scattered surface refuse within the fort compound. Even though the compound was regularly cleaned, such small pieces would remain because they were trampled into the soil, or were simply too small to be picked up (Schiffer 1976).

Few detailed studies have been conducted at historic sites to determine how artifacts and bones are distributed within and alongside various buildings. Such research could be potentially useful to predict where structures once existed, by examining the artifact/bone frequency distributions across the features. The historic journals suggest that dwellings were regularly cleaned and little refuse was allowed to accumulate in the living space. Studies by Wilks and Schiffer (1979), and excavations at Fort George, have shown that refuse sometimes accumulates in out-of-the-way places within the fort compound--along foot paths or behind buildings where they are soon forgotten and overgrown by vegetation. Thus, artifact/

bone frequency profiles across the dwelling, should show low frequencies inside the building, with sharp increases near the walls, and a steady decline outside, away from the walls. Unfortunately, however, this ideal frequency distribution is marred when buildings are torn down or cellars are filled with refuse--a pattern that is quite evident at Fort George and Fort Victoria (Losey et. al. 1975, 1976, 1978, 1979). If few other activities occurred after these buildings were torn down, it may still be possible to identify the locations of these structures by artifact/bone frequency distributions.

It is expected that activities in other buildings (ie., workshops, storage houses) would result in a unique set of cultural materials different from associated dwellings. The distribution of these materials within and beside the buildings would also be altered by cleaning activities, but such activities would be less intense in work areas that have dirt floors. Thus, in the blacksmith's shop or carpenter's shop, large debris was removed regularly, but sizable proportions of small items would be trampled into dirt floors. The corresponding distributional pattern would resemble a tri-modal curve with peaks associated with the two outside areas immediately adjacent to the walls, and with the building floor. The frequencies inside these buildings would likely be higher than that associated with dwellings, and a significantly higher artifact/bone ratio should occur.

To summarize, the discussion of the distribution and frequency of various cultural materials suggests that it should be possible to identify activity areas and features at historic sites on the basis of these remains. Figure 38 is a graphic representation of these frequency distributions in profile. The intensity of the peaks in the curves is presently speculation. With data, it may be possible to establish the relative proportions of the curves for a particular kind of site or structure.

FIELD AND LABORATORY METHODS

A large irregular area well beyond the early fort boundaries was systematically surveyed (Figure 39). Areas of the site could not be examined because they lay beneath roads. The remaining area has been cultivated to a

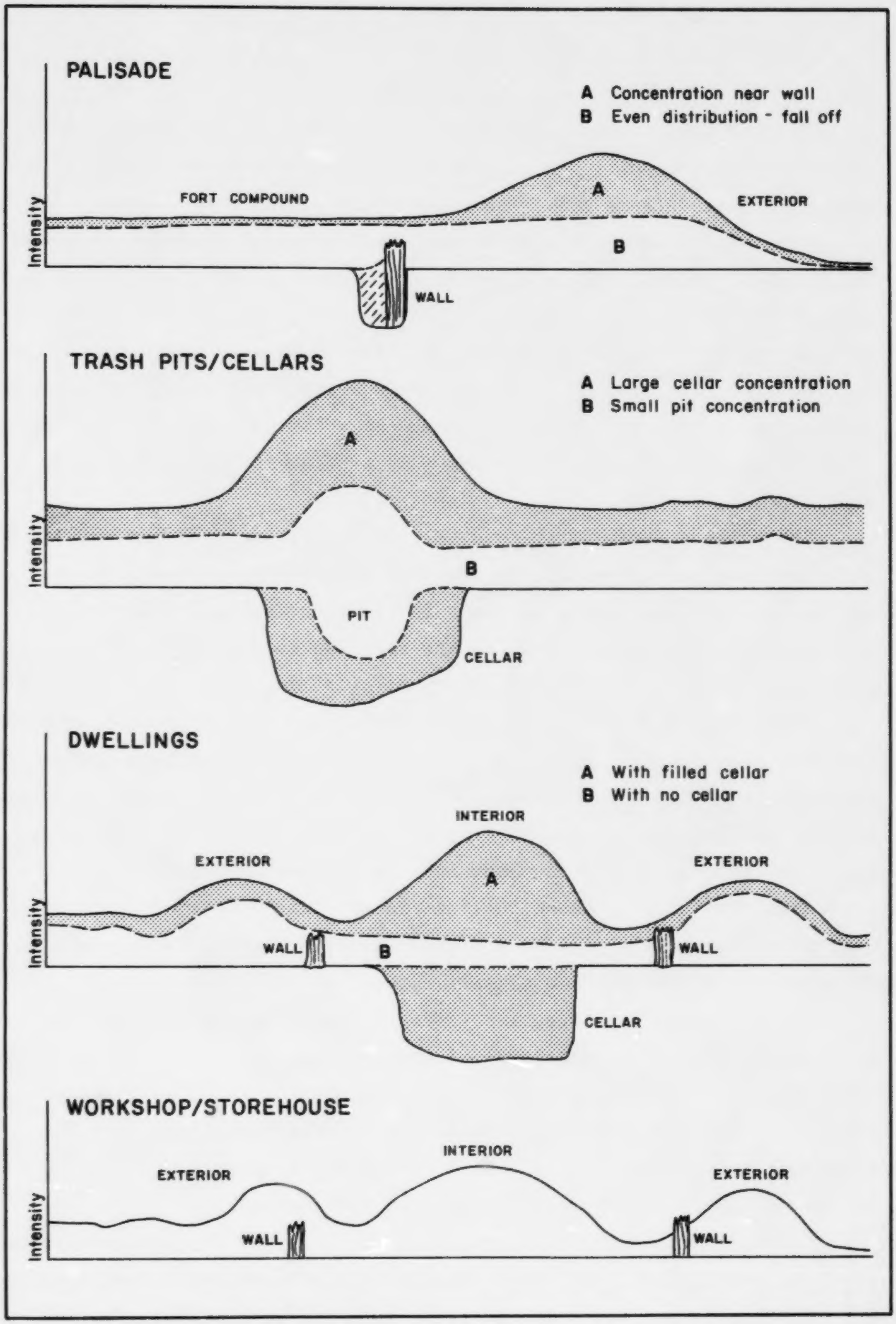
PALISADE
A Concentration near wall
B Even distribution - fall off
FORT COMPOUND
A
EXTERIOR
B
Intensity
WALL
TRASH PITS/CELLARS
A Large cellar concentration
B Small pit concentration
A
Intensity
B
PIT
CELLAR
DWELLINGS
A With filled cellar
B With no cellar
INTERIOR
EXTERIOR
A
EXTERIOR
Intensity
WALL
B
WALL
CELLAR
WORKSHOP/STOREHOUSE
INTERIOR
EXTERIOR
EXTERIOR
Intensity
WALL
WALL

Figure 38: Bone/Artifact frequency distribution across features

depth of 25 - 30 cm for the past 40 years.

All artifacts, bone, and flagstone fragments on the plowed surface were counted in continuous 1 m wide strips oriented in a north-south and east-west direction (Figure 39). The north-south strips were 10 m apart and the east-west strips were 5 m apart. These strips were divided into one meter squares and frequencies were counted for each material type, ie., artifacts, bone, and flagstone. The sample area represents roughly 11% of the entire surface and provides data for 2195 one meter squares.

Because this sample is statistically representative, it was decided the data could be used to interpolate frequency distributions in the areas that were not sampled. A synagraphic mapping program (SYMAP) was used to map and interpolate the data.

SYMAP was programmed to produce contour maps of the site which connect all locations having similar data values or where a continuous data field is implied. SYMAP was also programmed to run trend surface analysis and to map remaining residuals. Readers are referred to Chorley and Haggett (1968) and Dougenik and Sheehan (1976) for a detailed description of these methods.

These statistical methods are probably best illustrated by an example. The mean bone density inside the fort walls was found to be two bone fragments per square meter, but only one fragment per square meter immediately outside the fort walls, and falling off to zero further away from the walls. Some variation around these means would be present in each area. If a high bone density of 1.8 is found outside the fort walls, use of trend surface and residual analysis will help identify whether such a value might randomly occur or whether it is a significant signal.

Contour, trend surface, and residual maps were computed for each individual category of bone, artifacts, flagstone, and all categories combined. These maps were useful to identify local anomalies which were then more closely examined in profile to determine whether they fit any of the frequency curves that were proposed in the previous section.

A number of assumptions are made in this study:

1. It is assumed that cultivation has affected the spatial frequency distributions of cultural materials only minimally and that major trends and patterns can still be measured archaeologically.

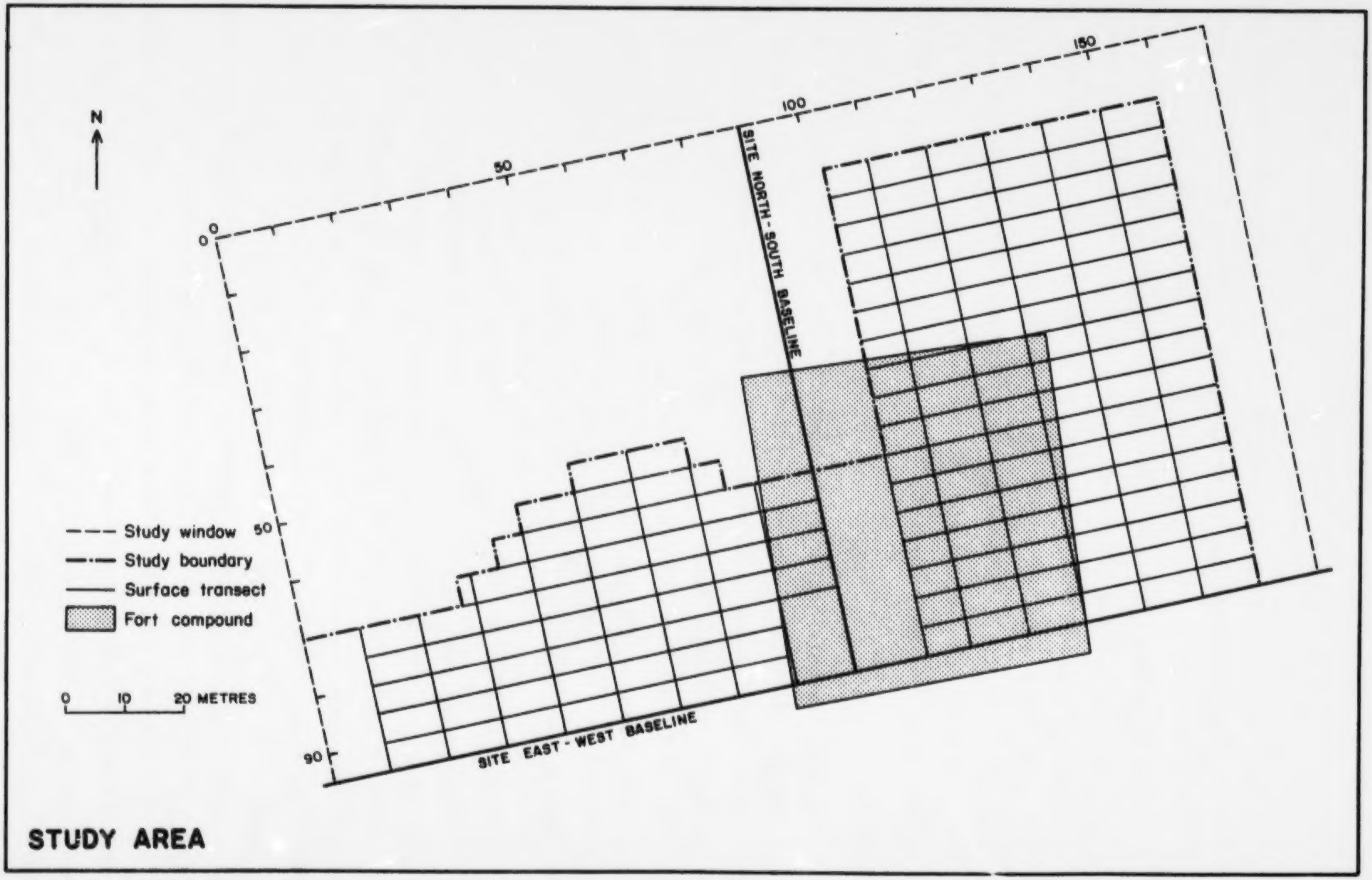
N
0
50
100
150
SITE NORTH - SOUTH BASELINE
SITE EAST - WEST BASELINE
90
Study window
Study boundary
Surface transect
Fort compound
0 10 20 METRES
STUDY AREA

Figure 39: Surface transect study area showing compound.

2. It is assumed that cultivation affects all material classes equally and that destruction by cultivation is evenly distributed over the study area.
3. It is assumed that artifact/bone/flagstone frequencies are reliable indicators of historic activities and features. Furthermore, it is assumed that the degree of fragmentation occurs evenly over the study area and within the material category.
4. Finally, it is assumed that all surface materials in the study area are contemporaneous to the fur trade era (although this may not be entirely correct, it is expected to be largely true).

RESULTS

The results obtained from the computer simulation analyses showed some interesting trends that were not evident from the preliminary test excavations. The results are only summarized here. More detailed information is presented in Figure 40 which shows the major features located during the 1982 field season; this map can be compared to the contour maps which have been placed at the end of the paper (Figures 41 - 44). Figure 45 shows profiles from various high anomalies in more detail and compares them to the previously proposed frequency distribution models.

Frequency Distribution Maps

The maps of each material class, as well as the combined map, showed major anomalies inside and outside the early Fort Dunvegan. Flagstone anomalies are more frequent inside than outside the fort walls. Inspection of the flagstone residual map showed that the east anomalies are relatively weak. Numerous flagstone concentrations occur within the fort walls, are aligned linearly, and have low frequencies in the center bordered on each side by high concentrations. Anomalies which are more square to circular having unimodal frequency distributions are also present.

Very low artifact frequencies were recorded on all surface transects over the entire study area (Figure 41). The few anomalies which are present are found both inside and outside the fort compound. Individual anomalies have high frequencies in the center, tapering off at the edges, or they consist of two highs, with low frequencies in between.

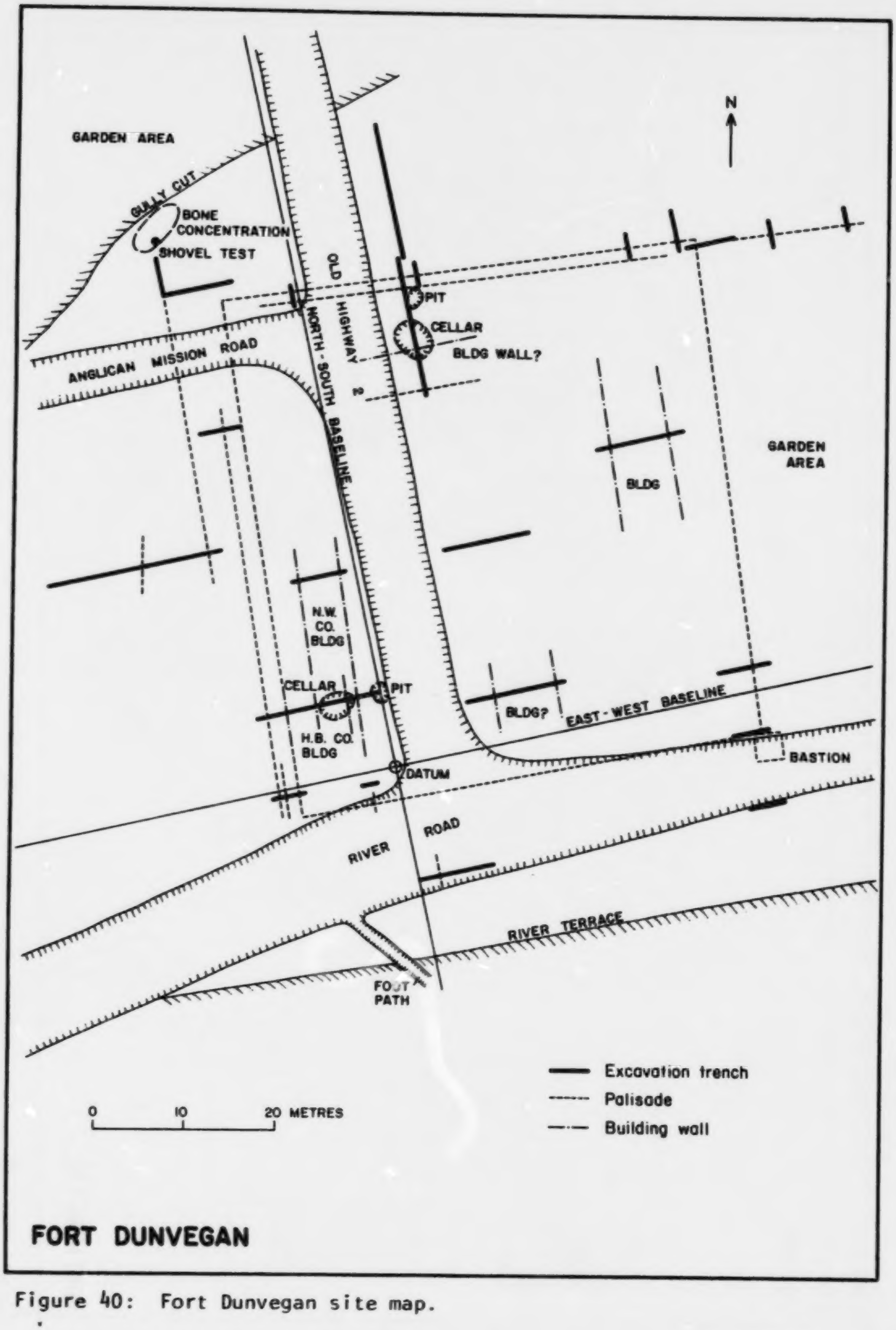
N
GARDEN AREA
GULLY CUT
BONE CONCENTRATION
SHOVEL TEST
OLD HIGHWAY
NORTH-SOUTH BASELINE
PIT
CELLAR
BLDG WALL?
ANGLICAN MISSION ROAD
GARDEN AREA
BLDG
N.W. CO. BLDG
CELLAR
PIT
H.B. CO. BLDG
BLDG?
EAST-WEST BASELINE
BASTION
DATUM
RIVER ROAD
RIVER TERRACE
FOOT PATH
0
10
20 METRES
Excavation trench
Palisade
Building wall
FORT DUNVEGAN

Figure 40: Fort Dunvegan site map.

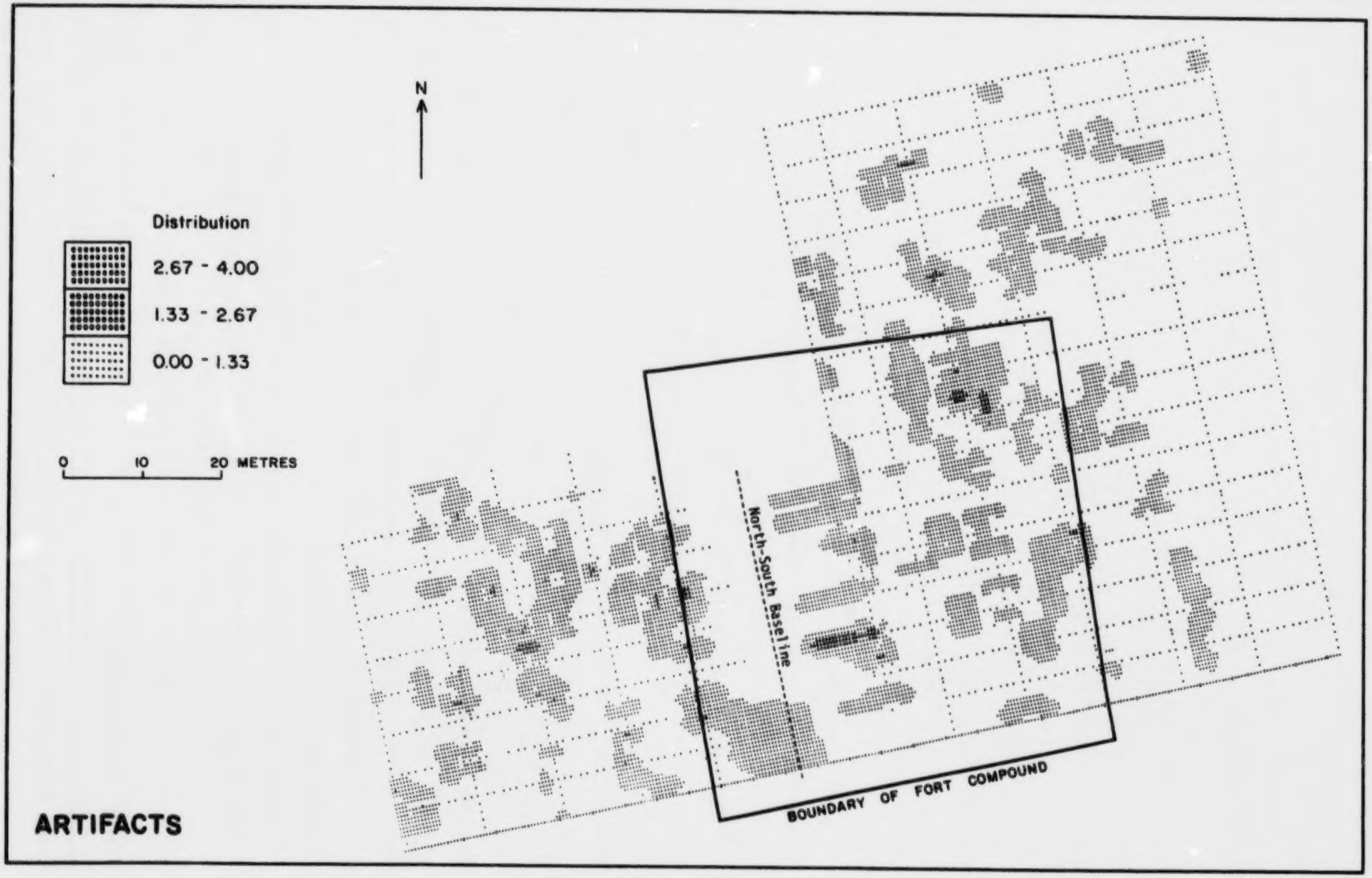
N
Distribution
2.67 - 4.00
1.33 - 2.67
0.00 - 1.33
0
10
20 METRES
North-South Baseline
BOUNDARY OF FORT COMPOUND
ARTIFACTS

Figure 41: Dunvegan Contour map: Artifacts, showing distribution of data point values in each frequency level.

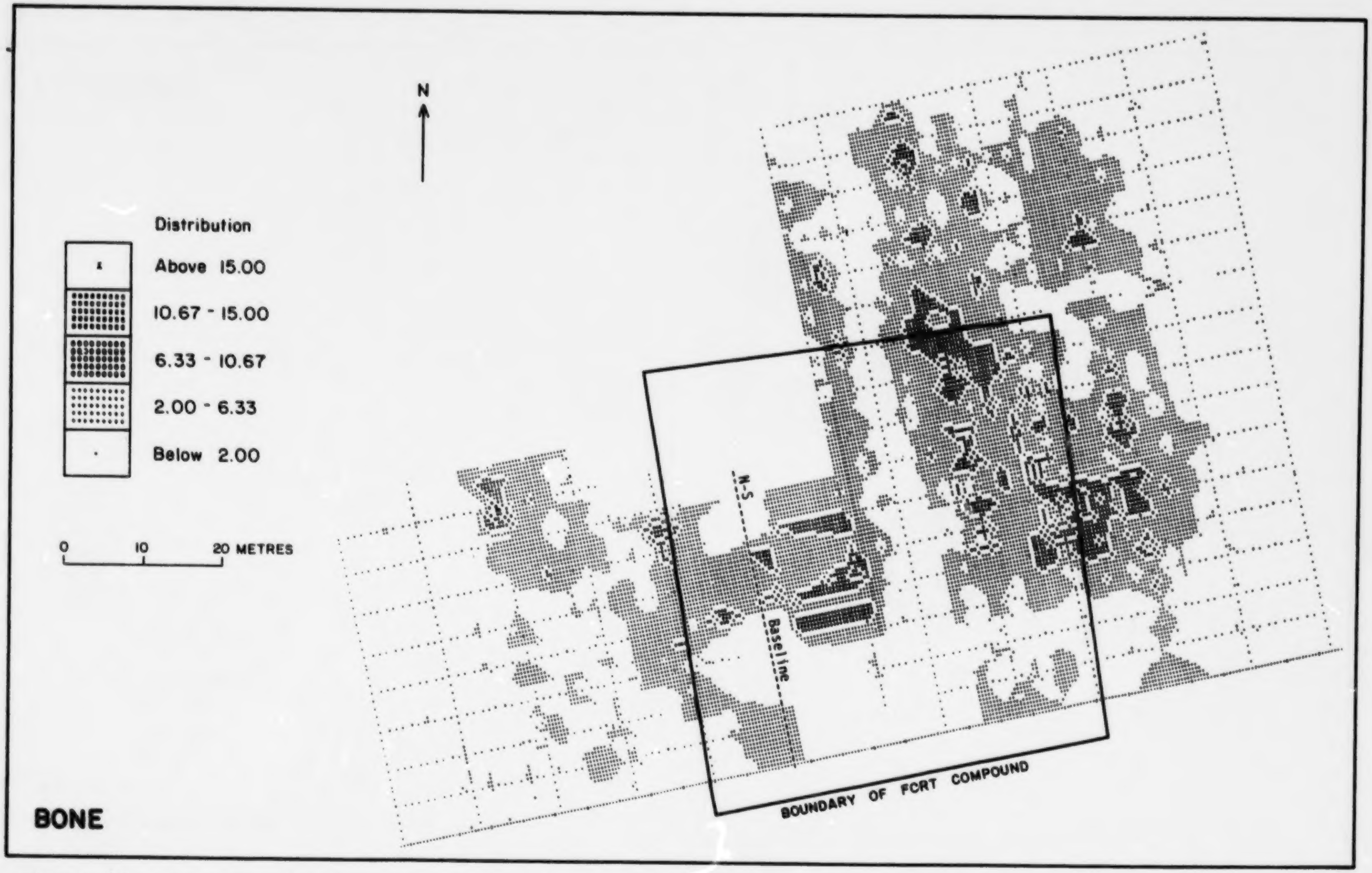
N
Distribution
Above 15.00
10.67 - 15.00
6.33 - 10.67
2.00 - 6.33
Below 2.00
0
10
20 METRES
N-S
Baseline
BOUNDARY OF FCRT COMPOUND
BONE

Figure 42: Dunvegan Contour map: Bone, showing distribution of data point values in each frequency level.

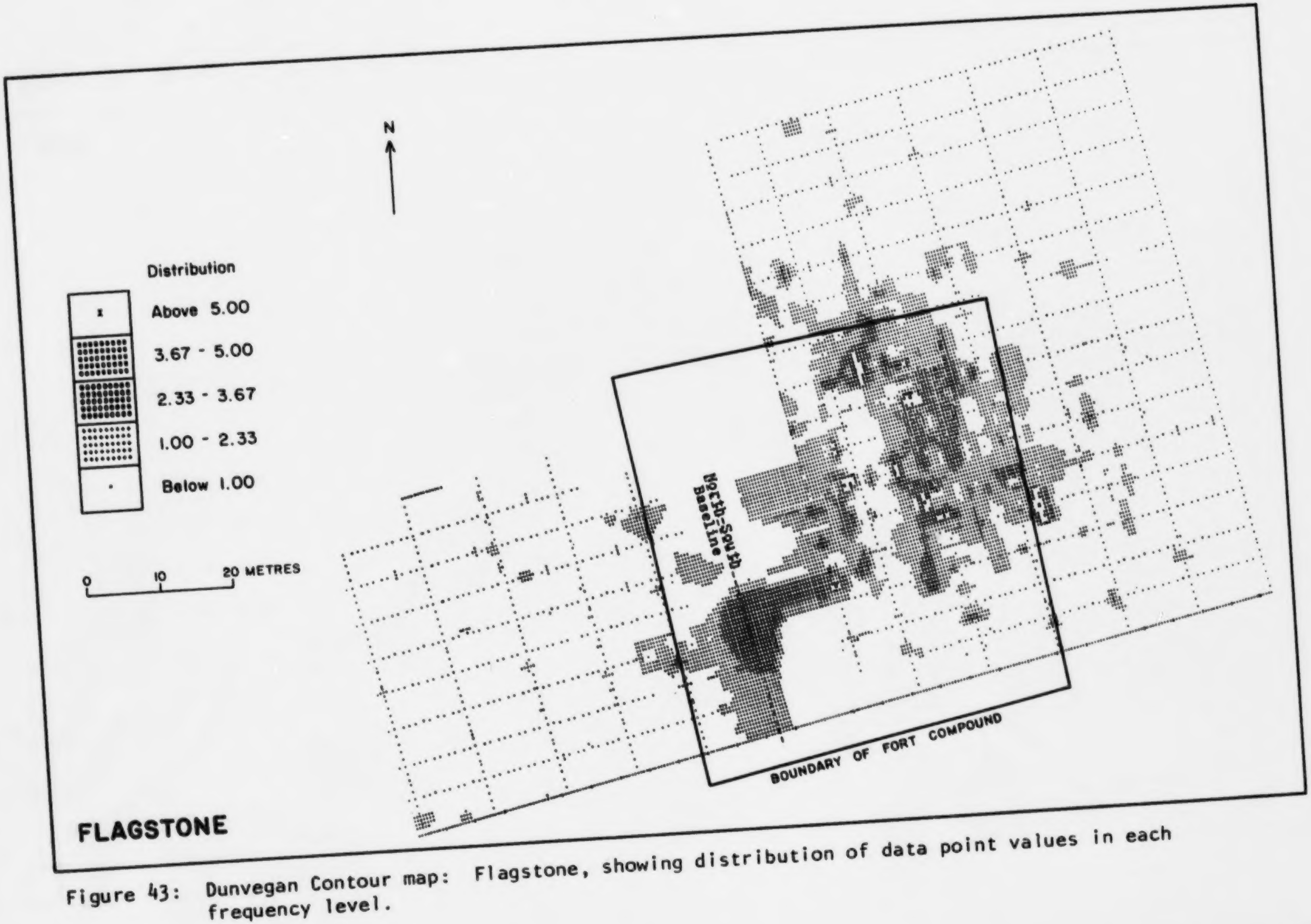
N
Distribution
Above 5.00
3.67 - 5.00
2.33 - 3.67
1.00 - 2.33
Below 1.00
0
10
20 METRES
North-South
Baseline
BOUNDARY OF FORT COMPOUND
FLAGSTONE

Figure 43: Dunvegan Contour map: Flagstone, showing distribution of data point values in each frequency level.

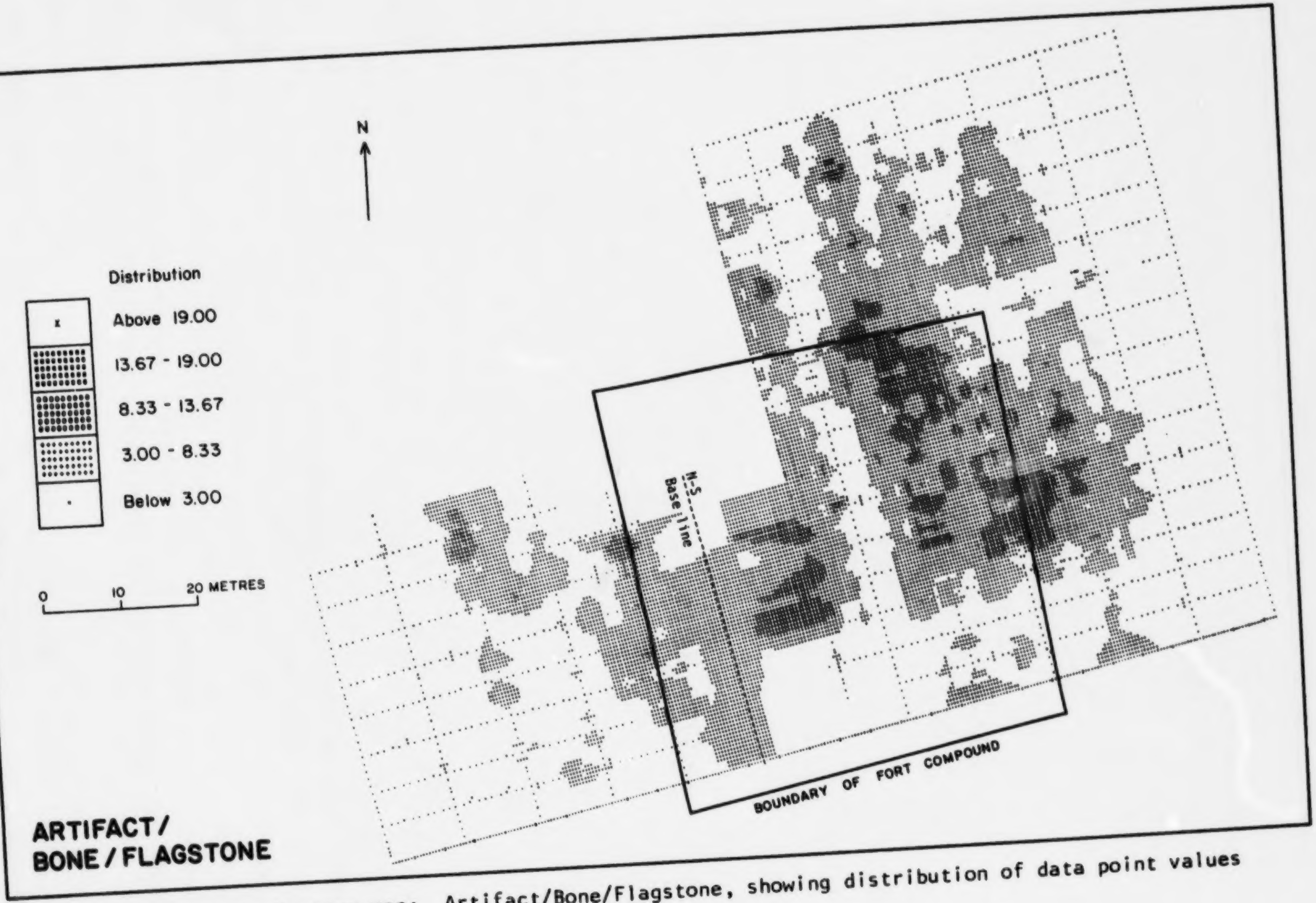
N
Distribution
Above 19.00
13.67 - 19.00
8.33 - 13.67
3.00 - 8.33
Below 3.00
0
10
20 METRES
N-S
Base line
BOUNDARY OF FORT COMPOUND
ARTIFACT/
BONE/FLAGSTONE

Figure 44: Dunvegan Contour map: Artifact/Bone/Flagstone, showing distribution of data point values in each frequency level.

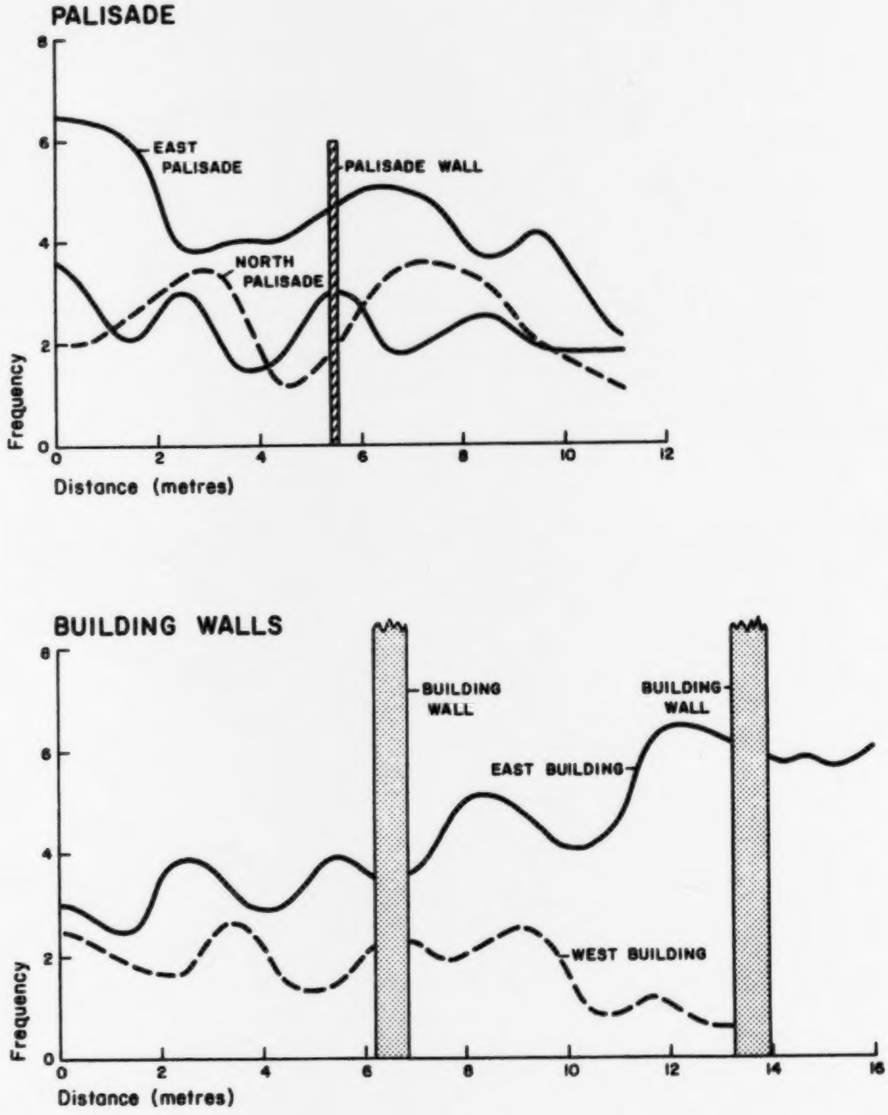

Figure 45: Frequency distribution profiles across features.

Bone fragments have the highest frequencies and are found scattered throughout the entire study area (Figure 42). Numerous concentrations occur around the fort perimeter and, more frequently, within the fort compound. One area near the middle of the fort compound has very low frequencies running north-south. Bone frequency profiles are unimodal, bimodal, and even trimodal in shape. The majority, however, tend to be unimodal, that is, a single localized high frequency.

When flagstone, artifact and bone frequencies are combined, fewer high anomalies are computed (Figure 44). Each anomaly is larger, more dispersed, and shows no well defined shapeor frequency profile. The majority of these anomalies are within the fort compound, but a few smaller concentrations are present around the fort perimeters. Combining all material types is slightly misleading, since the two most numerous material types, flagstone and bone, will dominate SYMAP mapping.

The contour maps predicted that bone, flagstone, and artifact anomalies should be present under the Old Highway No. 2 that runs through the site. However, thorough examination of this area with trend surface analysis shows that the anomalies are not quite as high as was initially predicted. But they still remain comparatively large and may represent a building feature in this area.

Trend Surface Analysis

Results from the trend surface analysis and residual mapping confirmed that most anomalies initially projected by the contour maps, are not due to random noise in the study sample. Total variation explained is highest in bones, followed by flagstone, and finally artifacts. In other words, the correlation between the projected surface and the actual data is highest in bones, then flagstone, and lowest in artifacts. These results are probably best explained by the fact that both flagstone and artifacts occurred in much lower than expected quantities in areas outside the fort compound, while bone frequencies were slightly more evenly distributed over the entire study area.

Comparisons of Frequency Distributions to Features

The shapes of major flagstone, bone and artifact distributions across the entire study area have already been discussed. More specific statements about the relationships of these frequency curves to possible features cannot be made until the features are identified by further excavations. However, a preliminary comparison was made between the combined bone/artifact frequencies and the known excavated palisades and possible buildings to gain an indication of whether the frequency curves fitted any of the expected curves previously described (Figure 45). Frequency data across major palisades show that frequencies either decrease or show little change near the interior of the wall. On the outside of the wall, they increase slightly and then begin to drop proceeding away from the wall. Frequencies near the west wall tend to be very variable. This may be due to the existence of several palisades in the area. Results from the building transects are inconclusive. The only possible pattern currently identifiable is an increase inside some buildings and towards the palisade walls which are quite close by.

DISCUSSION AND CONCLUSIONS

Many of the results obtained from synagraphic mapping at Dunvegan cannot be thoroughly assessed until a larger area of the site is excavated. Further research will allow a refinement of the methods and perhaps enable more explicit definition ofthe relationship between surface frequency distributions and surface features. However, a few preliminary observations can be made about this study and its potential.

The presence of high flagstone concentrations, together with their distribution shape, can indicate the presence of dwellings. It will be interesting to see how closely these anomalies correspond to dwelling walls or other subsurface features. Also, those areas where high flagstone concentrations are closely associated with high bone frequencies may resemble traditional English tofts. If such a relationship does exist, high bone frequencies could be useful to help identify buildings or living areas at other similar sites where flagstone was not used for building construction.

The association between high flagstone frequencies and buildings located during excavations was not as definite as expected. There are a number of possible reasons for the discrepancies which must be tested with additional archaeological data. For example, there is already some indication that the North West Company constructed buildings using wooden sills placed in shallow trenches; that is, flagstone was not used for wall construction. Secondly, accurate interpretation of relative flagstone frequencies requires some idea of what percentage of the total this sample represents. For example, a building with flagstone foundations was found on the west side of the fort. But the contour map showed no high localized flagstone anomalies that could relate to walls only moderate quantities scattered over the entire building area. It may be that lower concentrations can represent building features. If it can be shown that only two or three flagstone fragments over a larger area can indicate building remains, the measurement scale would require adjustments to permit confirmation of these features.

The comparison of bone/artifact frequency distributions to known features was somewhat inconclusive. The best evidence for any sort of pattern was found along fort walls. However, although walls were associated with slightly lower material frequencies, it would still be difficult to identify the locations of these features if their exact position were not already known. But on a more general scale, material frequencies do decline dramatically five to 10 m from the fort walls. These results would certainly be useful when attempting to quickly find fort or site boundaries.

A number of large bone/artifact anomalies are also present along fort walls. Observations at other sites indicate that a great deal of refuse was dumped near fort entrances, or not far from fort walls. A similar pattern exists at Fort Dunvegan. Some of the high concentrations are roughly centered along the wall and may be related to gates (which are often located at the midpoint of a wall). There is an absence of materials along a north-south strip that runs from one end of the fort to the other, near its center. These lows may represent a major walkway that was kept clear of debris by continual use and may resemble a similar refuse pattern described by Wilk and Schiffer (1979) for walkways in contemporary situations.

The study results have even broader implications for frequency distributions on plowed sites in general and how cultural and natural factors affect general spatial patterns (Schiffer 1976). Certainly artifacts, bones, and other cultural debris are subject to many factors that could move them from their original place of deposition, but such disturbance does not necessarily totally destroy all distributional patterns at archaeological sites. The data suggest that it may be difficult to precisely define walls of structures because concentrations have been smoothed out and sometimes show more variability. But it appears that the more general spatial patterns are still evident and are very useful to identify major features and activity areas at sites. Eventually, with more research, the exact amount of distortion could be measured and perhaps even corrected. Therefore, it is suggested that remains from plow zones in archaeological sites should be given precise spatial provenience since they are probably closely related to undisturbed features at the site. If more evidence for this postulation can be gathered, it may permit the use of disturbed data more effectively than before.

It will also be useful to further examine various bone and artifact anomaly intensities to determine whether different concentrations are related to entirely different features. As well, it would be useful to compile surface to subsurface artifact and bone ratios to determine whether surface materials are good predictors of overall site densities. If such ratios are consistent, the surface frequencies could be used to develop a sampling design for the site. This scheme would ensure that enough materials from each area are collected to carry out adequate comparative tests, as well as to ensure that the entire variety of materials is collected. The first step toward using these surface data for future sampling designs is to determine whether such a relationship exists through careful surface collections and subsequent excavations.

The use of initial surface plotting methods such as SYMAP has important implications for choosing the proper sampling design for archaeological sites. For example, at Dunvegan, SYMAP suggests that the sample be stratified since not all areas are equally rich in artifacts or faunal material. It also demonstrates where to stratify the study area.

Probably the best method of acquiring a representative sample from an archaeological site is to first identify various features or activity areas at the site, and then to sample each of these areas. If surface material distributions allow us to predict where such areas are located, our sampling designs will be much more accurate, saving both time and money in the process.

A major difficulty in using synagraphic mapping techniques for assessing subsurface features is apparent when attempting to objectively decide whether anomalies are significant or whether they are simply due to random variation, sampling error, or collection error. Use of trend surface analysis eliminates some of the guess work involved in this process. At Dunvegan, some anomalies were eliminated because they were predicted by the trend surface or sample data variation. Future investigations at Dunvegan should help to refine this method even more. Finally, the potential for trend surface analysis to predict where anomalies may be located in areas where no data can be collected is particularly useful at Dunvegan. SYMAP consistently predicted that high anomalies are located under Old Highway No. 2. Although trend surface analysis indicates that these anomalies are smaller than was initially predicted, they still appear to be significant and require further archaeological investigations.

To conclude, much research and testing is still necessary before the results from the surface transect study at Dunvegan can be thoroughly evaluated. However, the general implications of the potential of this method for use at other archaeological sites are already clear. The method should be simply considered as an aid for quick and more efficient assessment of archaeological sites and testing models that have been proposed for those sites, and for developing future excavation and research strategies for a site. This method of data collection and interpolation could apply equally well to undisturbed archaeological contexts; only a different initial systematic sampling method would be required. Large undisturbed sites could still be systematically shovel-tested and the data used to compute various synagraphic maps. Finally, it is no longer reasonable to ignore archaeological data that have been exposed by agricultural activities. These data must be incorporated during the initial stages of site planning and testing, and used to develop future excavation strategies at sites. Perhaps historic sites are ideal to start investigating these methods since many more variables that might affect them can be controlled or are better understood.

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